RECLAMATION

Managing Water in the West

Draft Environmental Assessment

2009 WARREN ACT CONTRACT AND LICENSE FOR DELTA LANDS RECLAMATION DISTRICT 770

EA-09-18

U.S. Department of the Interior
Bureau of Reclamation
Mid Pacific Region
South Central California Area Office
Fresno, California

February 2009

This page intentionally left blank.

Table of Contents

Section 1 Purpose and Need for Action 1
1.1 Background 1
1.2 Purpose and Need 2
1.3 Scope 3
1.4 Potential Issues 3
Section 2 Alternatives including proposed action 6
2.1 No Action 6
2.2 Proposed Action 6
Section 3 Affected Environment & Environmental Consequences 14
3.1 Water Resources 14
3.2 Land Use 64
3.3 Air Quality 73
3.4 Noise 75
3.5 Biological Resources 75
3.6 Cultural Resources 84
3.7 Indian Trust Assets 86
3.8 Socioeconomic Resources 87
3.9 Environmental Justice 89
Section 4 Consultation and Coordination 92
4.1 Fish and Wildlife Coordination Act (16 USC . 651 et seq.) 92
4.2 Endangered Species Act (16 USC . 1521 et seq.) 92
4.3 National Historic Preservation Act (15 USC 470 et seq.) 92
4.4 Migratory Bird Treaty Act (16 USC Sec. 703 et seq.) 93
4.5 Executive Order 11988 – Floodplain Management and Executive Order 11990- Protection of Wetlands 93
Section 5 List of Preparers and Reviewers 93
Section 6 References 93

List of Acronyms, Abbreviations and Definition of Terms

af	acre-feet (the volume of water one foot deep and an acre in area)
APE	Area of potential effect
ARPA	Archaeological Resources Protection Act
BO	Biological Opinion
cfs	cubic feet per second
Contract	Warren Act Contract
Contract Year	March 2009 through February 2010
CVP	Central Valley Project
Corps	Army Corps of Engineers
CVPIA	Central Valley Project Improvement Act
District	Delta Lands Reclamation District #770
Documents	Licenses and Contracts
DWR	California Department of Water Resources
EA	Environmental Assessment
EO	Executive Order
ESA	Endangered Species Act
FKC	Friant-Kern Canal
FONSI	Finding of No Significant Impact
FWCA	Fish & Wildlife Coordination Act
KRSA	Service area boundaries of entities diverting from the Kern River
Licenses	Licenses for the Erection, Maintenance, Operation and Storage of Temporary Structures on federally owned lands
M&I	Municipal and Industrial
NAGPA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
Non-Project Water	Flooding from the Kings, Kaweah and Tule rivers
NRHP	National Registry of Historic Places
FWA	Operating Non-federal Entity
Operational Guidelines	Friant Division Operational Guidelines
Reclamation	Bureau of Reclamation
Report	Non-Project Water Report
SHPO	State Historical Preservation Officer
SJVAB	San Joaquin Valley Air Board
SJVUAPCD	San Joaquin Valley Unified Air Pollution Control District
SWP	State Water Project
WRP	Wetlands Reserve Program

List of Figures and Tables

Name of Figure or Table	Page Number
Figures	
Figure 1 Location of the District within the Tulare Lake Basin of the southern San Joaquin Valley	**4**
Figure 2 Location of Wetlands in the vicinity of the District	**5**
Figure 3 Kings River Pumping Station	**9**
Figure 4 Kaweah/St. John's Pumping Stations	**11**
Figure 5 Tule River Pumping Station	**12**
Figure 6 Pine Flat Dam	**17**
Figure 7 Terminus Dam on the Kaweah River	**18**
Figure 8 Success Dam and Reservoir	**20**
Figure 9 A comparison of annual flow in the Kings River upstream and downstream from the pump station	**22**
Figure 10 A comparison of annual flow in the Kaweah (St. Johns) River upstream and downstream from the pump station	**23**
Figure 11 A comparison of annual flow in the Tule River upstream and downstream from the pump station	**24**
Figure 12 A comparison of percent of average flow in the Kings River upstream and downstream from the pump station	**26**
Figure 13 A comparison of mean flow in the Kings River upstream and downstream from the pump station	**27**
Figure 14 Comparisons of the percent of average flow in the Kaweah (St. Johns) River upstream and downstream from the pump station	**29**
Figure 15 A comparison of mean flow in the Kaweah (St. Johns) River upstream and downstream from the pump station	**30**
Figure 16 A comparison of percent of average flow in the Tule River upstream and downstream of the pump station	**31**
Figure 17 A comparison of mean flow in the Tule River upstream and downstream from the pump station	**32**
Tables	
Table 1 Facilities operated by the District for diverting floodwater into the Friant-Kern Canal	**8**
Table 2 Flood control storage in major reservoirs affecting the Tulare Basin.	**15 & 16**
Table 3 January through July flows within the Kings, Kaweah and Tule rivers and the amount of flow diverted during years the District held contracts	**34**
Table 4 Delta Lands Reclamation District No. 770 FKC Floodwater Pump-In Program 1997, 1998, & 2006 Operations	**40 - 42**

Name of Figure or Table	Page Number
Tables (continued)	
Table 5 Pump-in Quantity, Canal Losses and Kern River Flows	**43**
Table 6 Kings River Water Quality on Pump-in Dates	**44**
Table 7 Kaweah River Water Quality on Pump-in Dates	**45**
Table 8 Tule River Water Quality on Pump-in Dates	**46**
Table 9 Summary data for groundwater basins within the southern two-thirds of the Central Valley regional aquifer	**47**
Table 10 Summary of changes in reported land use from 1996 to 1998 in counties comprising the Tulare Basin	**52**
Table 11 Federal-status wildlife and plant species with the potential to occur in the vicinity of the Kings, Kaweah/St. Johns and Tule River pumping facilities, and along those drainages downstream from the Friant-Kern Canal	**58**
Table 12 Species Occurrences Identified in the CNDDB not on the FWS Species List	**59**
Table 13 County-Level Socioeconomic Data	**70**

Section 1 Purpose and Need for Action

1.1 Background

The Kings, Kaweah, Tule and Kern rivers drain from the Sierra Nevada Mountains into the landlocked Tulare Lake Basin and are the primary sources of surface water to the southern San Joaquin Valley. There is no natural outlet for water flowing into the Tulare Lake Basin. Historically, the flow from these rivers converged in the basin forming Tulare Lake, however, these lands were converted from lakebed to agricultural land in the 1940's. Delta Lands Reclamation District #770 (District) lies completely within this basin (Figure 1) and is vulnerable to flooding from the Kings, Kaweah and Tule rivers (Non-Project Water.)

For the Kaweah and Tule Rivers, Non-Project Water is the flow that is in excess of the irrigation and spreading demand in the basin and would, in the absence of the proposed project, cause flooding and potential damage in the Tulare Lakebed. For the Kings River, Non-Project Water would be any flow that is directed to the Tulare Lakebed by the Army Corps of Engineers (Corps) after flow in the North Fork channel has been maximized.

The Warren Act (Act as of February, 21, 1911, CH. 141, (36 STAT. 925)) authorizes the Bureau of Reclamation (Reclamation) to negotiate agreements to store or convey non-Central Valley Project water when excess capacity is available in federal facilities. The Central Valley Project Improvement Act (CVPIA) of 1992, Title 34 (of Public Law 102-575), Section 3408(c), Additional Authorities, authorizes the Secretary of the Interior to enter into contracts pursuant to Reclamation law and this title with any Federal agency, California water user or water agency, State agency, or private nonprofit organization for the exchange, impoundment, storage, carriage, and delivery of Central Valley Project (CVP) and non-project water for domestic, municipal, industrial, fish and wildlife, and any other beneficial purpose, except that nothing in this subsection shall be deemed to supersede the provisions of section 103 of Public Law 99-546 (100 Stat. 3051). Section 305 of the Reclamation States Emergency Drought Relief Act of 1991, enacted March 5, 1992 (106 Stat. 59), also authorizes Reclamation to utilize excess capacity to convey non-project water.

Historically, Reclamation has entered into Warren Act contracts with the District to allow the conveyance and disposition of Non-Project Water through the Friant-Kern Canal (FKC). In addition, licenses have been issued in the past to allow access and installation of portable pumping equipment on Reclamation lands (License.)

Beginning in 1978, through a series of letter agreements and contracts, made pursuant to the Warren Act, the District has used excess capacity in the FKC to convey flood flows from the

Kings, Kaweah, and Tule Rivers during periods of excessive rainfall to help alleviate damage to farm land, property and crops within the District's boundaries. In 1983, the District executed its first long-term Warren Act contract with Reclamation to divert Non-Project Water into the FKC over a 15 year period. One-year contracts were issued in 1998 and 1999 water years. No contract was signed for the 2000 water year. A temporary contract with a term of May-August 2006 was executed and 29,206 acre-feet (af) of water was pumped into the FKC. Another temporary contract with a term of January-August 2007 was executed however no water was pumped into the FKC under this contract due to the dryness of the water year. Another temporary contract with a term March 1, 2008 through February 28, 2009 was drafted but not executed due to unresolved issues related to the deposition of the flood waters. A contract is proposed to avoid flood related damage to the valuable agricultural infrastructure of the Tulare Lake Basin beginning March 1, 2009 and extending for a period not to exceed one year which is the subject of this environmental analysis. Additionally Reclamation is working on evaluating the environmental effects of execution of a contract with a term of up to 25 years.

Reclamation anticipates the District would conduct pump-ins intermittently and for short periods of time during particularly wet water years when Non-Project Water exists. Floodwater could threaten to flood the District during any future water year, but based on past hydrology, flooding would be likely in one out of four or five years on average. Reclamation and the District intend to pursue negotiations of a long-term Warren Act contract (Contract) and License. If approved, Reclamation and the District would enter into a long-term Contract and License for a term not to exceed 25 years. The actual contract term will be determined during public negotiation.

The finalization and approval of a long-term Contract and License are not expected to be completed and executed until after March 1, 2009. Therefore, another short-term contract to cover contract year 2009 (March 1, 2009 through February 28, 2010) is needed in case damaging floodwater threatens the District in 2009 while the long-term contract is under development. The previous Environmental Assessment (EA) EA-08-08 entitled "One Year Warren Act Contract and License for Delta Lands Reclamation District #770" dated May 29, 2008, analyzed Warren Act contract execution through February 2009.

1.2 Purpose and Need

Reclamation proposes to execute a contract with the District for the conveyance of Non-Project Water from the Kings, Kaweah and Tule River watersheds in the FKC. In addition, Reclamation proposes to issue a license to the District to allow access and operation of facilities on Reclamation owned lands for the purpose of pumping the water out of the rivers and into the FKC for disposition elsewhere. The purpose of the project is to pump potentially harmful water into the FKC, thereby protecting the District which is in the natural flood plain. The underlying need is to reduce or avoid flood-related damage to prime farmland, buildings, roads, bridges, and

other improvements in the Tulare Lakebed and other downstream lands, from Non-Project Water originating in the Kings, Kaweah and Tule rivers.

1.2 Scope

The geographic extent of the Proposed Action includes:

- Riparian areas and floodplains of the Kings, Kaweah and Tule rivers, downstream from the FKC (See Figure 1)
- Wetland areas in the vicinity of the Tulare Lakebed (See Figure 2)
- The FKC (See Figure 1)

This 2009 EA (EA-09-18) evaluates the execution of a one year contract beginning March 1, 2009.

Reclamation has no federal jurisdiction or control over the disposition of the water once it is conveyed through federal facilities and released into the Kern River. Management of the water then becomes the responsibility of the Kern River watermaster whose approval is required for acceptance of the water from the FKC and its subsequent release. Once released into the Kern River the water becomes part of the Kern River flows and no longer is tied to a Reclamation action. The ultimate use of the Non-Project Water is highly speculative and therefore will be discussed in general terms rather than specifically analyzed as part of this EA.

1.3 Potential Issues

- Water Resources
- Land Use
- Air Quality
- Noise
- Biological Resources
- Cultural Resources
- Indian Trust Assets
- Socioeconomic Resources
- Environmental Justice

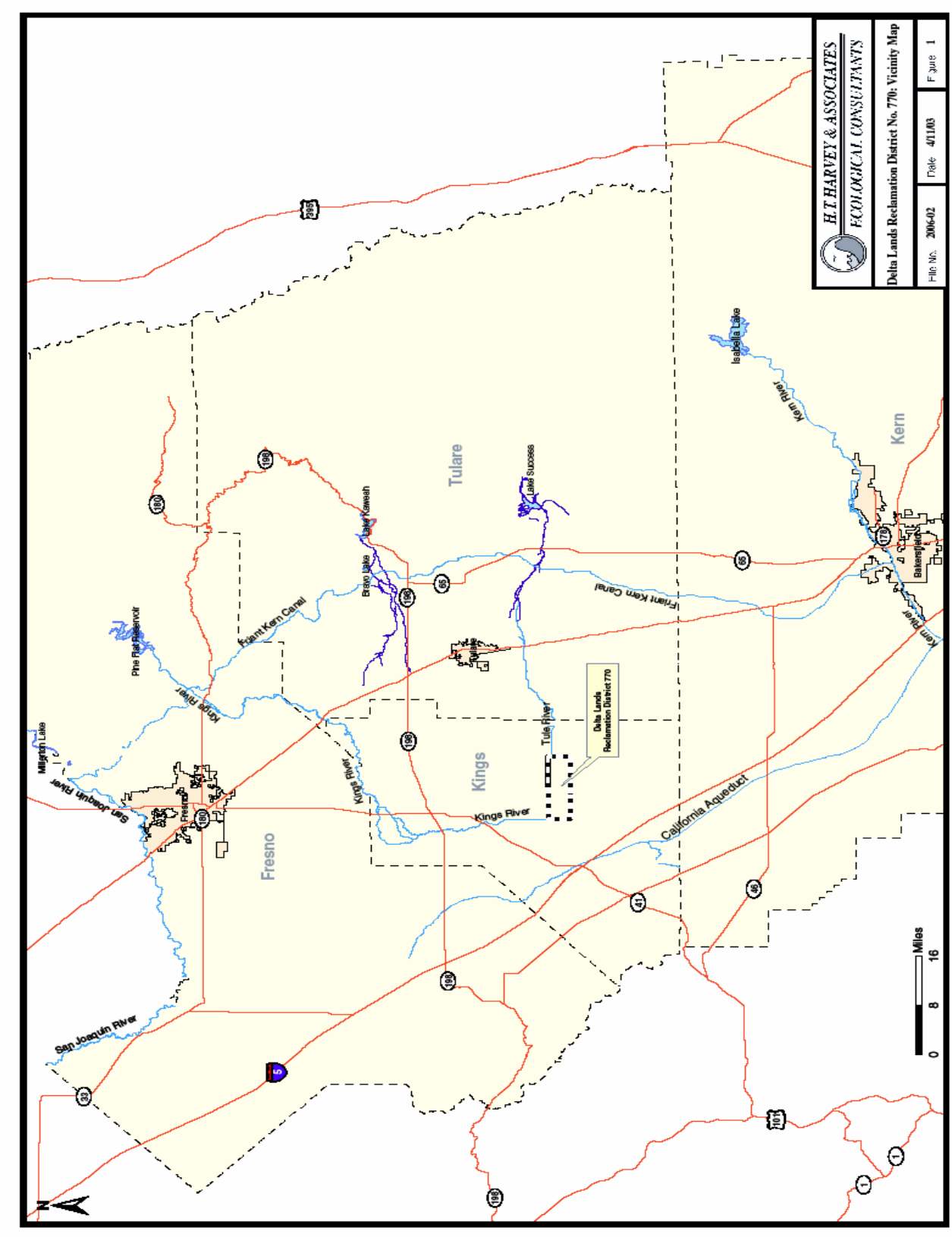


Figure 1 Location of the District within the Tulare Lake Basin of the southern San Joaquin Valley.

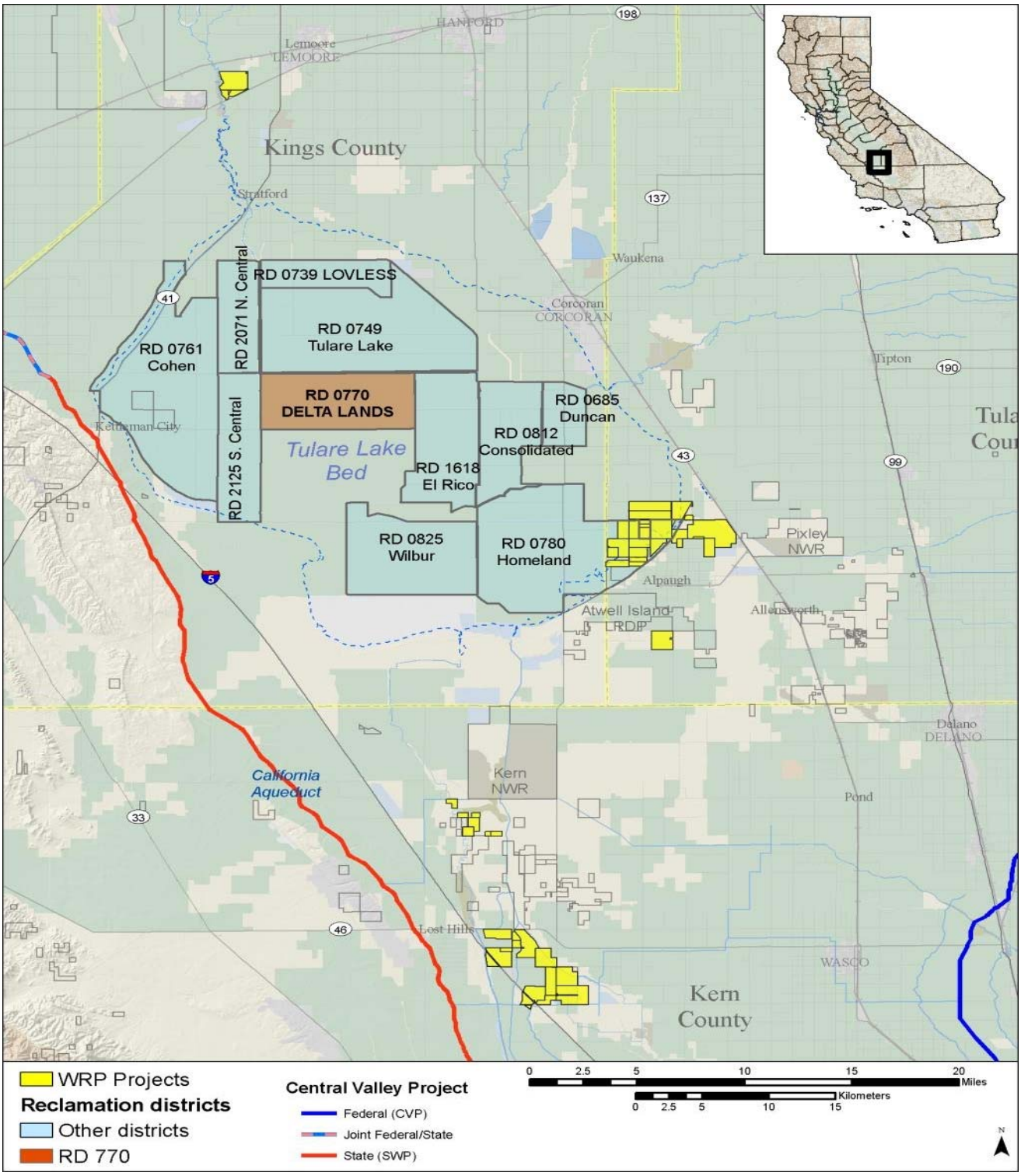


Figure 2 Location of Wetlands in the vicinity of the District

Section 2 Alternatives Including Proposed Action

2.1 No Action

Under the No Action Alternative, Reclamation would not execute a contract in 2009 with the District to divert Non-Project Water nor would Reclamation issue a license to the District to place pumps on Reclamation land. Under the No Action Alternative, Non-Project Water that otherwise could be diverted and conveyed within the unused capacity of the FKC, would continue downstream into the former Tulare Lake bed in the Tulare Lake Basin and pool on otherwise productive farmland as well as flood infrastructure in the area.

2.2 Proposed Action

The Proposed Action has two components. The issuance of a Warren Act contract and the issuance of a license for utilization of Reclamation land for pumping facilities. Each of these components will be described in a separate section below.

Issuance of Warren Act Contract

Reclamation would enter into a contract with the District to utilize otherwise unused capacity in the FKC to convey Non-Project Water pumped from the Kings, Kaweah and Tule Rivers for Contract Year 2009 in order to protect downstream agricultural lands and other improvements. The maximum amount of Non-Project Water to be conveyed in the FKC is 250,000 af per year.

The Non-Project Water would be conveyed from the points of pump-in facilities on each of the rivers into the FKC. The water would then go to the Friant Division or Cross Valley contractors to the extent they could put it to beneficial use and the remainder would be conveyed to an existing gate at the terminus of the FKC for discharge into the Kern River. Friant Division and Cross Valley contractors would adhere to the commitments made within and the terms and conditions required in the 2001 Friant and Cross Valley Long-term Contract Renewal Biological Opinion (BO) in relation to the use of the flood water within their service areas. BO requirements made for the use of CVP water would be similarly required for the use of the flood water within the districts.

Non-Project Water would be introduced only when: 1) there is excess capacity in the FKC, as determined by Reclamation in coordination with the Friant Water Authority (FWA) the current operating non-federal entity; 2) it meets the applicable water quality standards; 3) it meets the Corps flood control criteria; and 4) the release of water into the Kern River is coordinated with Kings, Kaweah, Tule and Kern River watermasters as applicable. Non-Project Water would be diverted through existing District facilities without modification to the FKC.

The District would be required to comply with the water quality monitoring program either described in or incorporated by reference within the Contract. (See Appendix C for the water quality monitoring requirements and sampling locations.) The District would conduct water quality analyses using a Reclamation-approved laboratory.

Floodwater Report and Delivery Plan

The Floodwater Report, required as a condition of the Contract, would account for the water pumped into the FKC. The Report would be due within 30 days after the ending date of a conveyance period and/or 30 days after the end of a Contract Year as defined in the Contract. For Contract Year 2009, the report is due no later than March 31, 2009.

Contract Related Environmental Commitments

The District would comply with all applicable water and air pollution laws and regulations of the United States and the State of California.

The District is required to implement a Quality Assurance Project Plan (See Appendix C). If the quality of the Non-Project Water from one or more of the rivers would significantly degrade the quality of water in or introduced into the FKC, the District would be required to immediately terminate pumping into the canal from the source that would cause the degradation.

Issuance of License

Reclamation has historically executed licenses with the District to erect and maintain pumps and related equipment within the right-of-way of the FKC. Under the previous licenses, the District constructed semi-permanent pumping plants to pump water into the FKC from the Kings, Kaweah and Tule Rivers. The infrastructure on which to mount the pumps is already constructed and in place. The piping needed is also already in place.

After a determination is made that pumping will occur in a given year the pumps are installed. This protects the pumps from degradation due to the weather and other environmental factors. Only mobilization and demobilization of equipment, and routine operation and maintenance of the pump stations are expected during the period of the License.

The License will allow the District to access federal land and erect, operate and maintain the pumps when they determine there is a need to pump. It also allows for the continued existence of the pump footings and other permanent infrastructure on federal lands. (See Appendix D for a draft license.) The pumping facilities would be owned and operated by the District.

The size and number of the pumps that are installed on the existing infrastructure and total pumping capacity at each station are listed in Table 1 below.

Table 1 Facilities operated by the District for pumping floodwater into the Friant-Kern Canal.

River System	*Discharge Pumps*	*Total Capacity (cfs)*
Kings River	6	600
St. Johns River (Kaweah River Delta)	12	1,200
Tule River	7	700
Total	25	2,500

Kings River Pumping Station

The pumping station on the Kings River is outside of the Reclamation right-of-way and located on the Alta Main Canal immediately downstream of the Alta Irrigation District diversion. The pump discharge is at the outlet of the FKC's siphon underneath the Kings River at FKC - Milepost 29.10 (Figure 3). The pumping station was constructed in 1982 and has an estimated capacity of 600 cfs (Table 1). The station consists of 6 diesel powered pumping units, each having a capacity of approximately 100 cfs. The District is working with the electrical purveyor to convert the pumps to obtain electricity at the site so electric motors can be installed.

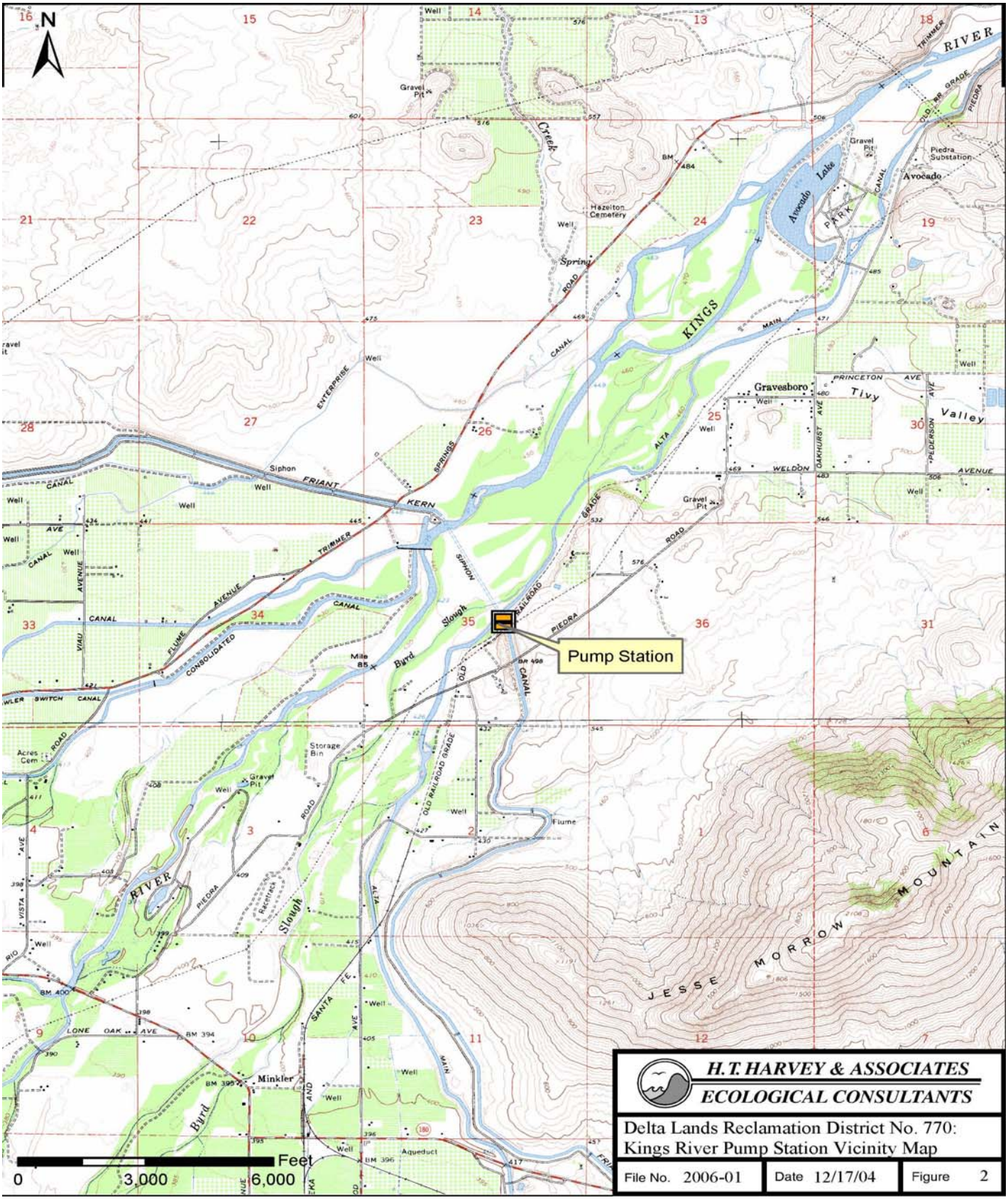


Figure 3 Kings River Pumping Station

Kaweah River Pumping Station

The pumping facilities for the Kaweah River consist of one station along the St. Johns River (Figure 4) (Pump Station #1). (Pump Station #2 will not be used in 2009.) The St. Johns River is a distributary channel of the Kaweah River system. Pump Station #1 is located immediately upstream of the siphon at the St. Johns River at Milepost 69.45 on the FKC. Pump Station #2 is immediately downstream of the siphon at Milepost 69.58. Pump Station #1 consists of eight pumping units, and Pump Station #2 contains four additional pumps (Table 1). The combinations of pumps and diesel motors are similar to those used on the Kings River. The total pumping capacity is approximately 1,200 cfs.

Tule River Pumping Station

Seven electric pumping units similar to those described for the Kings and Kaweah Rivers comprise the pumping station along the Tule River. The pumping station is located near Milepost 95.67 of the FKC (Figure 5). The estimated total pumping capacity of this station is 700 cfs (Table 1).

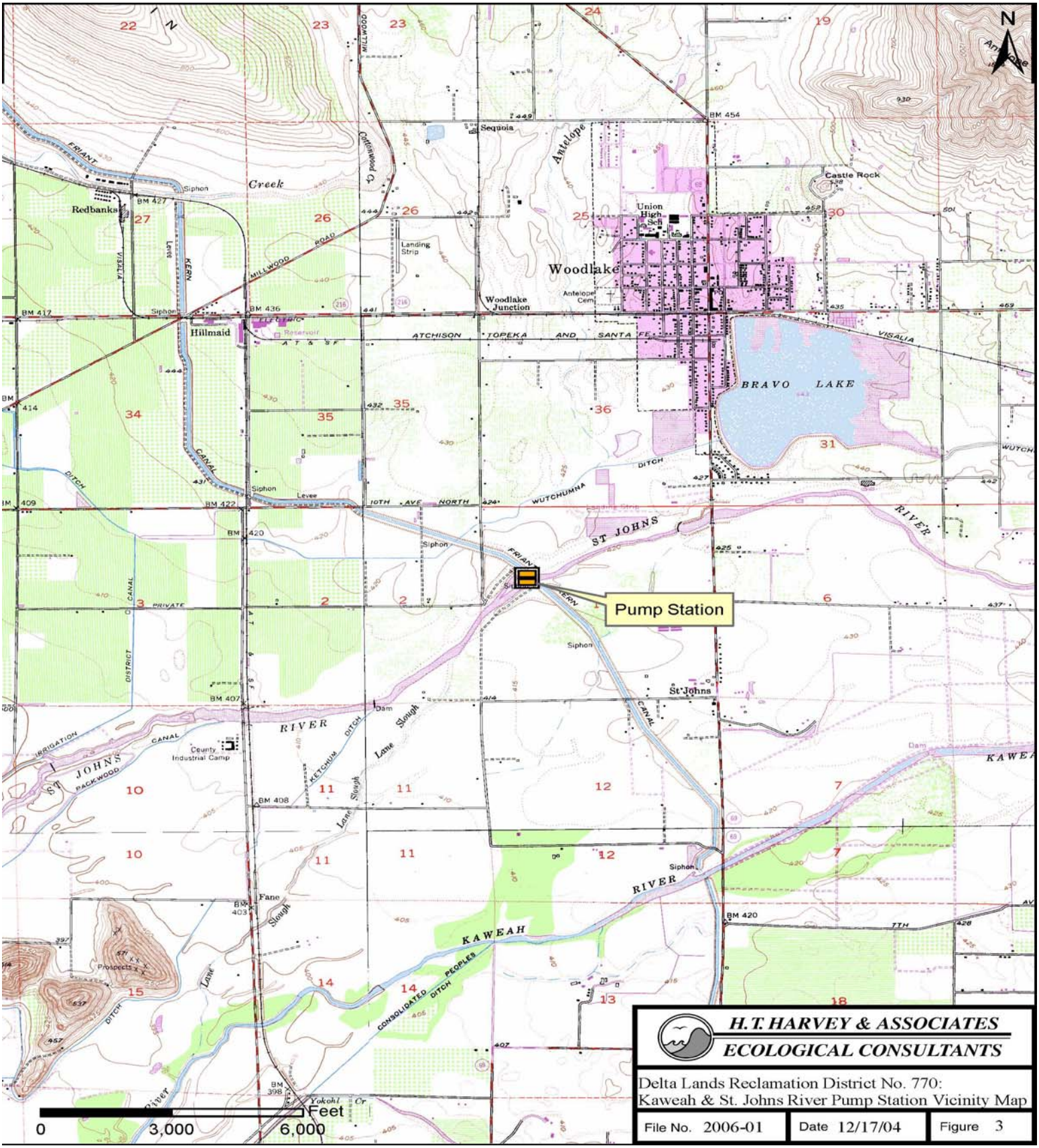


Figure 4 **Kaweah/St. Johns River Pumping Stations**

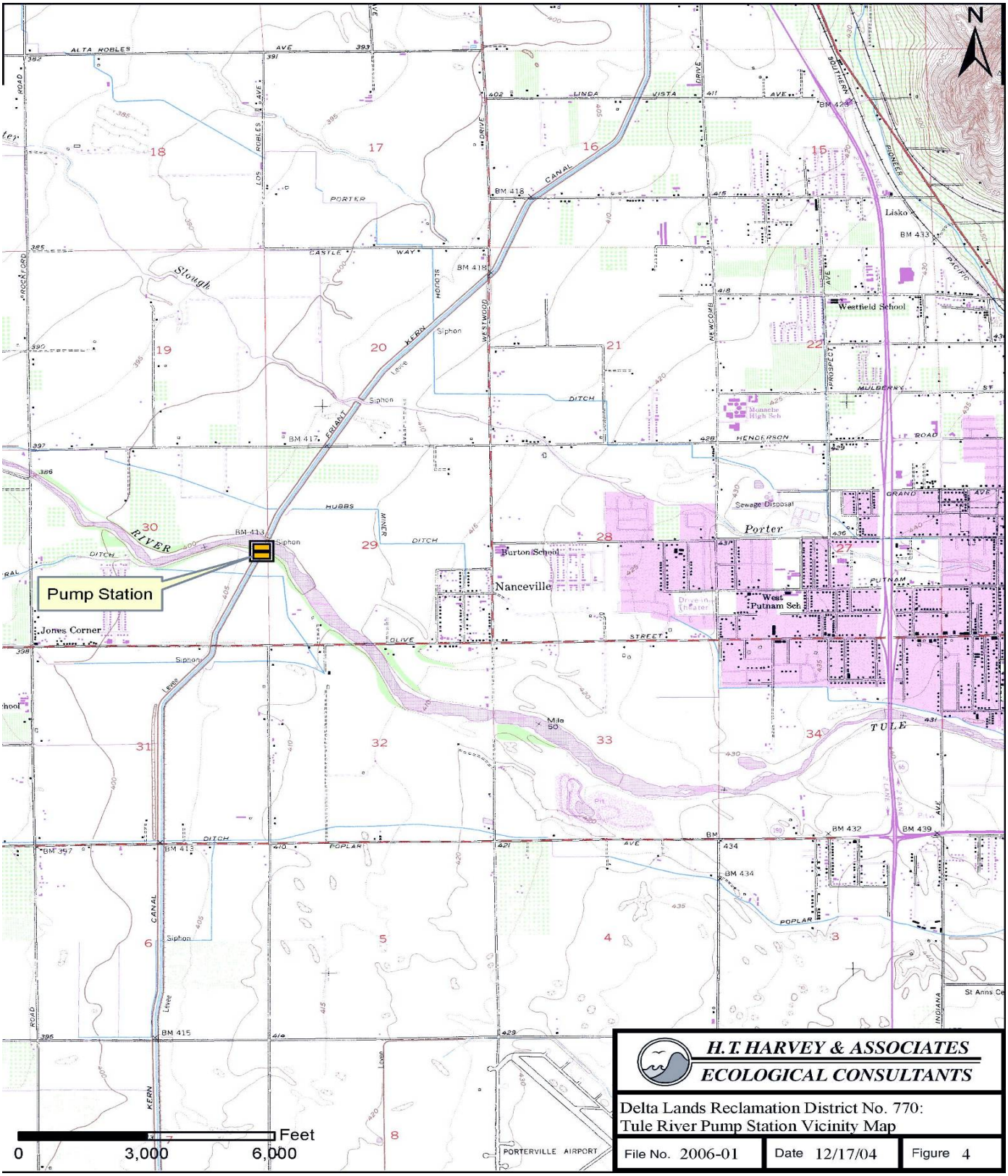


Figure 5 Tule River Pumping Station

License Related Environmental Commitments

The District would remove silt accumulation as directed by Reclamation and take steps to screen debris from water prior to pumping.

The District would comply with Fresno and Tulare County Noise Ordinance regulations as well as respond to any complaints from adjoining landowners and/or their attorneys regarding noise and take appropriate actions or cease pumping operations.

The District would comply with all applicable water, ground, and air pollution laws and regulations of the United States, the State of California and local authorities.

The District would not allow contamination or pollution of Federal lands, waters or facilities related to the project.

The District would not use any pesticides on Federal lands without prior written approval by Reclamation. If the District intended to use pesticides they must submit an Integrated Pest Management Plan 30 days in advance of pesticide application. All pesticides used would be in accordance with the current registration, label direction, or other directives regulating their use.

The District would immediately notify Reclamation of the discovery of any and all antiquities or other objects of cultural, historic, or scientific interest on Reclamation lands.

2.3 Kern River Only Alternative

This alternative is essentially the same as the Proposed Action except that the disposition of the flood waters would be limited to the Kern River. The Non-Project Waters would be conveyed from the points of pump-in facilities on each of the rivers to an existing gate at the terminus of the FKC for discharge into the Kern River, at which point it would be abandoned by the District.

Section 3 Affected Environment & Environmental Consequences

3.1 Water Resources

3.1.1 Affected Environment

The landlocked Tulare Basin is fed by four rivers whose watersheds extend high into the Sierra Nevada mountain range on the east side of the San Joaquin Valley. These rivers are the primary surface water sources for the southern San Joaquin Valley: the Kings, Kaweah, Tule and Kern rivers. These rivers all drain into the Tulare Lakebed which formerly was the site of Tulare Lake. The District lies completely within the Tulare Lakebed and is vulnerable to flooding from the Kings, Kaweah and Tule Rivers.

Tulare Lake

Tulare Lake was formerly the largest fresh-water lake in the western United States. The former lake and its surviving wetlands lie in the southern portion of California's San Joaquin Valley, about forty miles south of Fresno. In the wake of the Civil War, the bordering marshes were reclaimed, and in the twentieth century dams and diversions allowed the lake to be drained; it is now a shallow basin of fertile earth within the most productive agricultural region of the United States.

In 1849, the lake measured 570 square miles. Its size fluctuated from year to year due to varying levels of rainfall and snowfall, but it ranked as the largest freshwater lake west of the Great Lakes. The lake was "reclaimed" (emptied and dried up) between the 1950's and 1970's and over the course of a few decades as the Kaweah, Kern, Kings and Tule rivers were diverted upstream and canals were built to drain the lake. By the end of the nineteenth century the lake had almost completely disappeared. Because of the topography, the lake basin depression remains and a smaller version of the lake occasionally reappears during floods following unusually high levels of precipitation, as it did in 1997. Aggressive groundwater pumping since the draining of the lake has resulted in a significant lowering of the water table, causing subsidence of the land. (Wikipedia 2007)

San Joaquin Valley Flood Management

The basic flood management system in the San Joaquin Valley consists of reservoirs with reserved flood storage space to help regulate snowmelt from areas above the 5,000-foot level, while conserving water supplies for multiple purposes. Rain induced snow melt floods in the San Joaquin Valley tend to have higher peak flows than the temperature induced snowmelt floods. While reservoirs in the San Joaquin Valley provide some flood protection, available flood management storage space can fill quickly during rain-associated floods.

In the mid-1950's and early 1960's, the Corps constructed Pine Flat Dam on the Kings River, Success Dam on the Kaweah, Terminus Dam on the Tule River and Isabella Dam on the Kern River for flood control and water supply purposes (Table 2). All three projects are part of a system controlling water flow to the Tulare Lakebed.

Flood control operations on the Kings, Kaweah and Tule rivers are the responsibility of the Corps and are separate from Reclamation's operation of the CVP. The Corps manages water releases from the dams to maintain flows within the channel, thereby protecting adjacent uplands, if possible. Breached levees, rather than high-flow volumes, are likely to be the cause of flooding in uplands along the rivers.

The flood flows potentially subject to the proposed project arise only during times of heavy precipitation and substantial runoff. By definition, those flows will be substantially in excess of the demands of water rights holders on the various river systems. The largest volume of flood flows to the Tulare Lakebed historically emanate from the Kaweah and Tule Rivers as there is no natural outlet for floodwater to flow other than flowing into the lakebed. In a few cases, the Kings River has also contributed a significant amount of floodwater.

Floodwater releases are made based on the Corps's flood control criteria for operation of Pine Flat Dam on the Kings River, Terminus Dam on the Kaweah River and Success Dam on the Tule River. The diversion of Non-Project Water is also subject to coordination with Kings, Kaweah and Tule River basin water users represented by the Kings River Association, Kaweah and St. Johns River Association and the Tule River Association. These associations support the diversion of Non-Project Water that would otherwise damage lands in the Tulare Basin (Reclamation 1998a).

Table 2 Flood control storage in major reservoirs affecting the Tulare Basin. All the storage facilities are owned and operated by the U.S. Army Corps of Engineers.

Project Name	River	Type of Dam	Storage (af)	Maximum Flood Control Space (af)	Length (feet)	Height (feet)	Crest Width (feet)	Year
Pine Flat Dam (Pine Flat Lake)	Kings River	Concrete Dam	1,000,000	475,000	1,820	429	32	1954
Terminus Dam (Lake Kaweah)	Kaweah River	Earth Dam	143,000	142,000	3,245[(1)]	250	25	1961
Success	Tule	Earth Dam	82,000	75,000	11,140[(1)]	142	23	1961

Project Name	River	Type of Dam	Storage (af)	Maximum Flood Control Space (af)	Length (feet)	Height (feet)	Crest Width (feet)	Year
Dam (Success Lake)	River							
Isabella Dam (Isabella Lake)	Kern River	Earth Dam	568,000	398,000	4,952[(1)]	185	20	1953

(1) Length includes dikes, auxiliary dams and wing dams.
Source: Corps 1999.

Kings River

The upper watershed of the Kings River includes the North, Middle and South Forks, all of which converge in the foothills upstream from Pine Flat Dam. Downstream from the dam, the river bifurcates at Island and Army Weirs into the Kings River South, flowing into what was formerly Tulare Lake (and is now the farmed lakebed) and the Kings River North/James Bypass/Fresno Slough, flowing north into Mendota Pool.

Pine Flat Dam (See Figure 6) is the main flow-regulating facility on the Kings River and is used for flood management, water supply and power generation. Data collected and summarized by the Kings River Conservation District indicates the average annual runoff in the Kings River is 1,745,000 af. Annual runoff has varied from a low of 391,700 af in the 1923-1924 water year to a high of 4,476,400 af in the 1982-1983 water year.

Pine Flat Dam provides flood protection to approximately 200,000 acres of agricultural land in the Tulare Lakebed region. The major goal of the Corps in the flood operation of Pine Flat Dam, as specified in the Federal Flood Control Act of 1944, is to protect farmland in the Tulare Lakebed (Corps 1999). Flood releases are complicated by the bifurcation of the river downstream resulting in having two levels of flood releases, measured 60 miles downstream at structures, designed to convey flood flows north to the San Joaquin River and south to the Tulare Lakebed. The first level is to maximize releases up to channel capacity (4,750 cubic feet per second [cfs]), north to the San Joaquin River. The second level is to add flood releases up to 3,200 cfs going south to Tulare Lakebed (Corps 1999). This capacity is used after capacity to the north has been maximized and rain flood space is encroached in Pine Flat Lake, or greater than 4,750 cfs of supplemental flood releases are mandated by the snowmelt volume runoff forecast. Flood flows greater than 7,950 cfs in the Kings River are divided equally to maximize flood releases both north and south (Corps 1999).

Figure 6 Pine Flat Dam

Kaweah River

The upper watershed of the Kaweah River includes the North, Marble, Middle, East and South Forks of the Kaweah River, all of which converge in the foothills upstream from Lake Kaweah. Downstream from the lake, the main stem of the Kaweah River meanders southwest past Visalia and onto the valley floor. The Kaweah River drainage area upstream of Terminus Dam covers approximately 561 square miles. Terminus Dam is the main regulating facility on the Kaweah River and, like Pine Flat Dam, is used for flood management, water supply and power generation.

Terminus Dam (See Figure 7) is about two miles northeast of Lemon Cove and provides flood protection for the communities of Visalia, Tulare, Farmersville, Ivanhoe and Goshen, and the Tulare Lakebed (Corps 1999). The earth fill dam has a rain flood management reservation of 142,000 af that uses nearly the entire 143,000 af volume of the lake. Lake Kaweah is kept practically dry each winter because the flood management reservations are small compared with the drainage area tributary to the lake (Corps 1999). The lake provides limited protection from major rain floods. For instance, Lake Kaweah filled and emptied twice during the flood of 1997 (Corps 1999).

Figure 7 Terminus Dam on the Kaweah River

The Kaweah River splits into the St John's River and the Lower Kaweah River east of Visalia. The Lower Kaweah flows are distributed into Packwood Creek, Cameron Creek, and Mill Creek, many of which can "spill" into the Lakebed in wet years. Some of these creek channels are part of the Tulare ID distribution system.

Since the Kaweah River has no outlet to the ocean, all flows released from Lake Kaweah must be used or disposed of within the Kaweah River basin/Tulare Lake Basin; otherwise they can be damaging in the Tulare Lakebed (Corps 1999). When flood releases must be made from Lake Kaweah, all possible diversions for irrigation and land spreading are made.

A project to raise the spillway elevation of the dam by approximately 21 feet, increasing maximum reservoir storage 42,600 af to 186,000 af, was completed in 2005. This project increased the level of flood protection downstream to a 3.2 year event for the Tulare Lakebed and provides greater operational flexibility in the Tulare Lakebed flood management system (Corps 1999 and D Moss pers comm. January 9, 2008).

The Kaweah and St. Johns River Association have a policy which provides that water to which the member units of its association are entitled shall be utilized only within the Kaweah River hydrologic surface boundary. However, using the FKC to reroute unusable Non-Project Water solely for flood control purposes has been allowed (Bruce George personal communication November 6, 1997). The Kaweah and St. Johns River Association anticipate that this will continue to be the position of the Association (Bruce George personal communication November 6, 1997).

Diversions of water from the Kaweah River system to the FKC have been, and would continue to be, coordinated between the District and the Association's watermaster as to the notice, timing and magnitude of the introductions.

Tule River

The upper watershed of the Tule River includes the North, Middle and South Forks of the Tule River, which converge in the foothills above Success Dam. Downstream from the dam, the main stem of the Tule meanders west through Porterville and across the valley floor until it drains into the Tulare Lakebed. Success Dam is the main regulating facility on the Tule River and, like the other dams discussed above, is used for flood management, water supply and power generation.

Success Dam (See Figure 8) is about six miles east of Porterville and is operated to provide flood management to agricultural areas along the Tule River, the Tulare Lakebed region and the City of Porterville. The flood management reservation of 75,000 af requires that the reservoir be nearly dry each winter, much like Lake Kaweah. This reservoir, like Lake Kaweah, emptied twice during the flood of 1997 (Corps 1997).

Figure 8 Success Dam and Reservoir

Similar to the Kaweah River, the Tule River has no outlet to the ocean and all flows released from Lake Success must be used or disposed of within the service area; otherwise they can cause damage in the Tulare Lakebed. A recent significant reduction in allowable storage at Success Reservoir on the Tule River, due to dam seismic stability issues, may increase the volume of Non-Project Water released from the reservoir, which, in turn, may create a greater need to pump such Non-Project Water into the FKC.

Flow Variability in the Kings, Kaweah (St. Johns) and Tule Rivers

Historically, January through July flow volumes in the Kings, Kaweah and Tule rivers have been quite variable. Figures 9 through 11 illustrate that the variability in flow volume that occurred in each of these drainages prior to the initiation of contracts with the District has continued to occur

with introductions into the FKC. Flow volumes have remained variable downstream from the points of diversion.

Local Wetlands

In recent years there has been significant acreage in the south eastern portion of the historic Tulare Lakebed area that has been converted back to wetland habitat, primarily under the U.S. Department of Agriculture program known the Wetland Reserve Program (WRP). Under this program the federal government pays to place a long-term easement on a property to preserve it for its wetland values and also pays to have the property reformed (de-leveled) to optimize its habitat benefits. The property remains in private ownership.

Much of this property has limited access to surface water for wetland purposes and persists in a wetland state using groundwater to the extent it is available (and affordable) and periodic access to floodwater. Access to floodwater for these properties has, at times, been provided by the District and/or landowners benefited by the District.

Figure 9 A comparison of annual flow in the Kings River upstream and downstream from the pump station. The chart depicts total flow in af for the months January through July for the period 1969 through 1998.

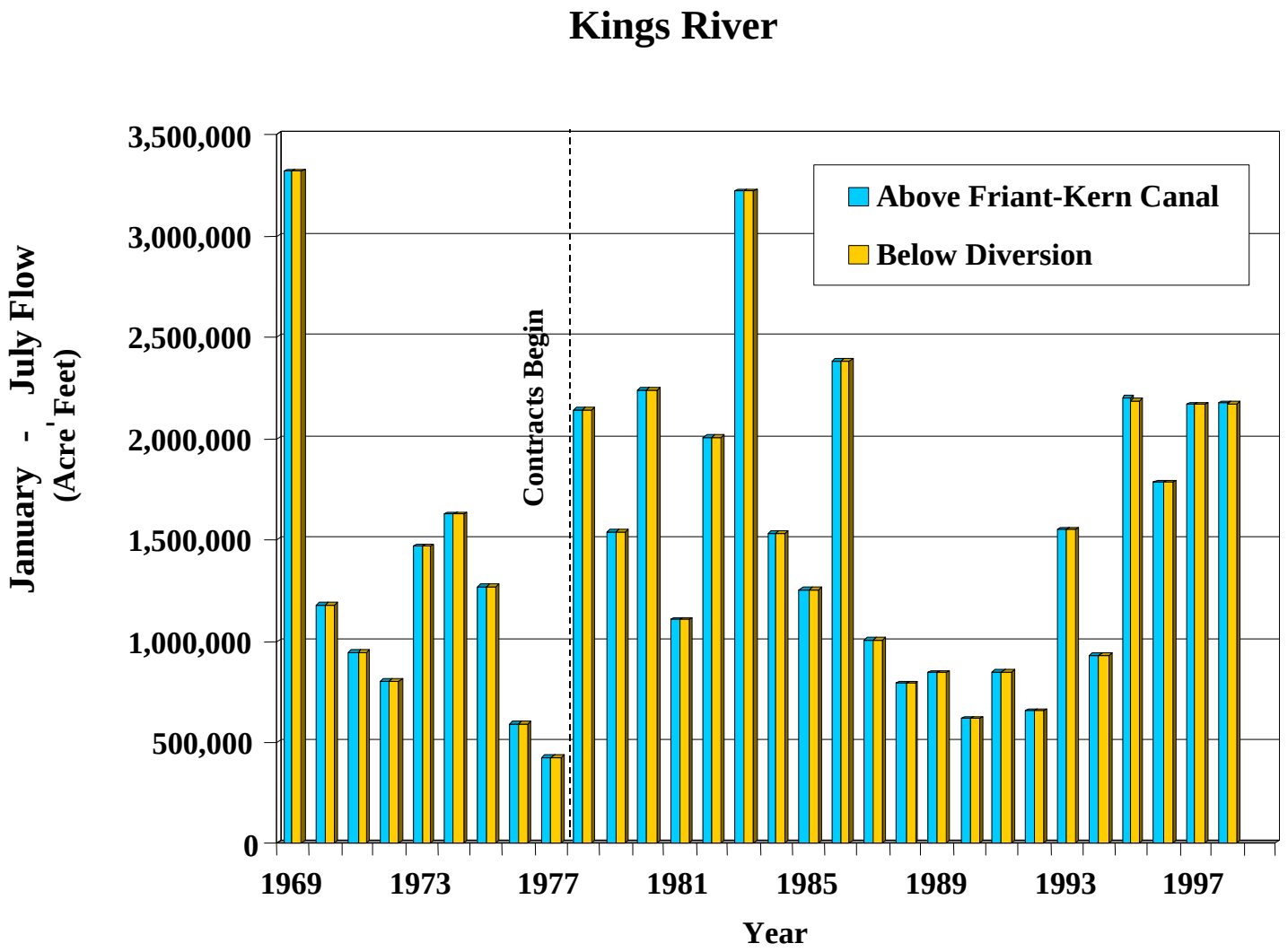


Figure 10 A comparison of annual flow in the Kaweah (St. Johns) River upstream and downstream from the pump station. The chart depicts total flow in af for the months January through July for the period 1969 through 1998.

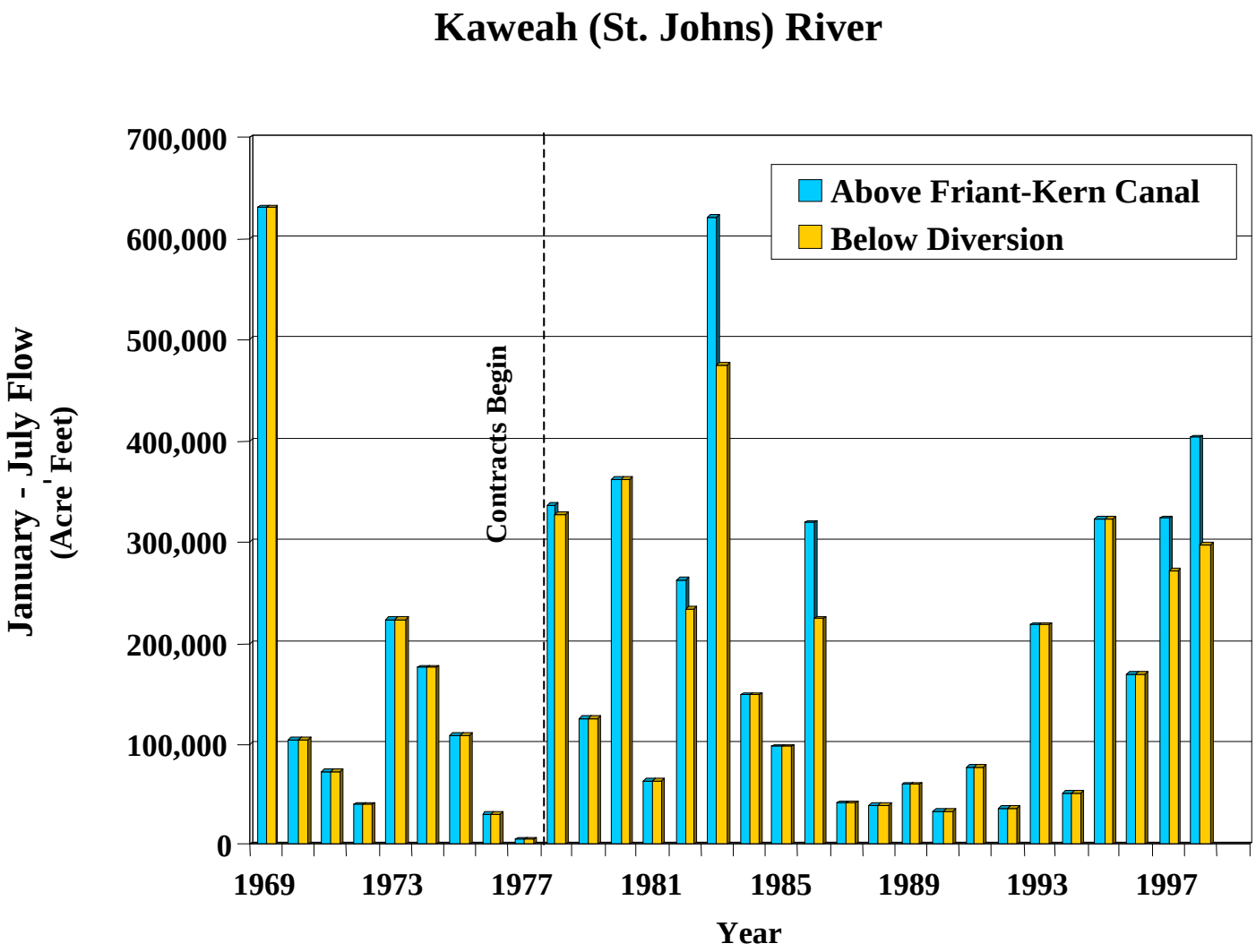
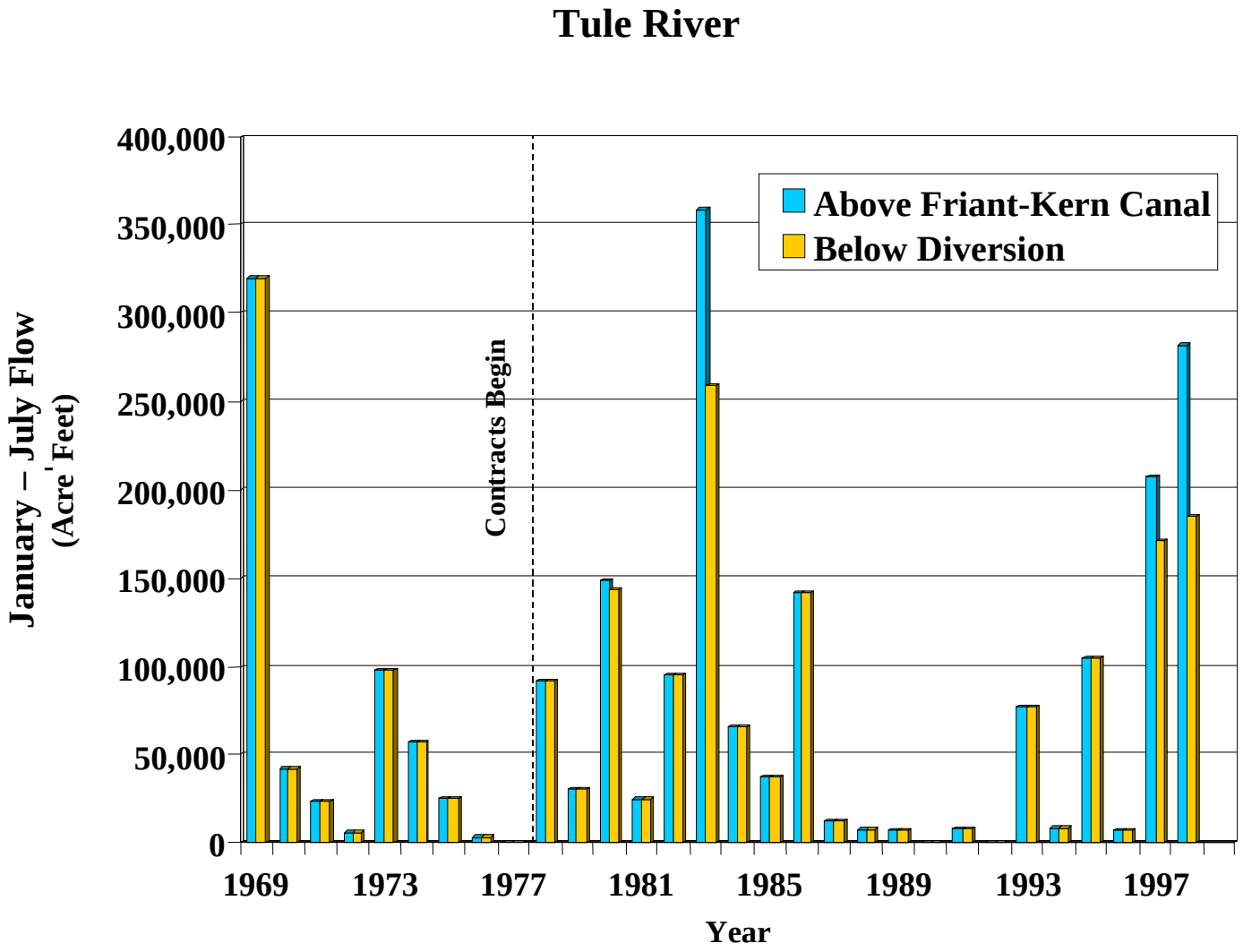


Figure 11 A comparison of annual flow in the Tule River upstream and downstream from the pump station. The chart depicts total flow in af for the months January through July for the period 1969 through 1998.



Pumping Stations and Diversions

Reclamation has historically executed licenses with the District to erect and maintain pumps and related equipment within the right-of-way of the FKC. The District constructed semi-permanent pumping plants to pump water into the FKC from the Kings, Kaweah and Tule Rivers. The size and number of the pumps that are installed on the existing infrastructure and total pumping capacity at each station are listed in Table 1 in the Proposed Action Section.

Figures 12 through 17 show that the Contract diversions are a relatively small amount of the total river's flows however the District has management facilities for the flood flows so any reduction in the flood flows reaching the District can save fields and crops from inundation and the resulting economic losses. Additionally, there are losses in the downstream reaches of the river channels before the water reaches the District. Diversion of what may seem to be a small percentage of the upstream flows can be a larger percentage of the flows that would have reached the District.

Kings River Introductions of Kings River water into the FKC have occurred only three times between 1978 and 1998 under previous Contracts. These flows were introduced in 1982, 1995 and 1998 (Table 3). River diversions into the canal ranged from 1,026 af to 12,700 af, when flows were between 135 percent and 148 percent of normal. The diversion of Non-Project Water decreased the volume flowing below the diversion point (over two million af) by a maximum of 0.58 percent (Figure 12). In summary, introductions from the Kings River under previous contracts were intermittent, infrequent and small. Future introductions, if approved, are expected to be similar in all aspects.

A monthly analysis of January through July flow volumes in the Kings River for the period 1978 through 1998 shows that, upstream from the point of diversion, average monthly flow volumes ranged from approximately 51,000 af in January to 405,000 af in June. Downstream from the point of diversion, the range was approximately the same (Figure 13).

Figure 12 A comparison of percent of average flow in the Kings River upstream and downstream from the pump station. The chart depicts the percent of average flow for the months January through July during years in which introductions by the District occurred. The percent of average was based on flows from January through July for the years 1978 through 1998.

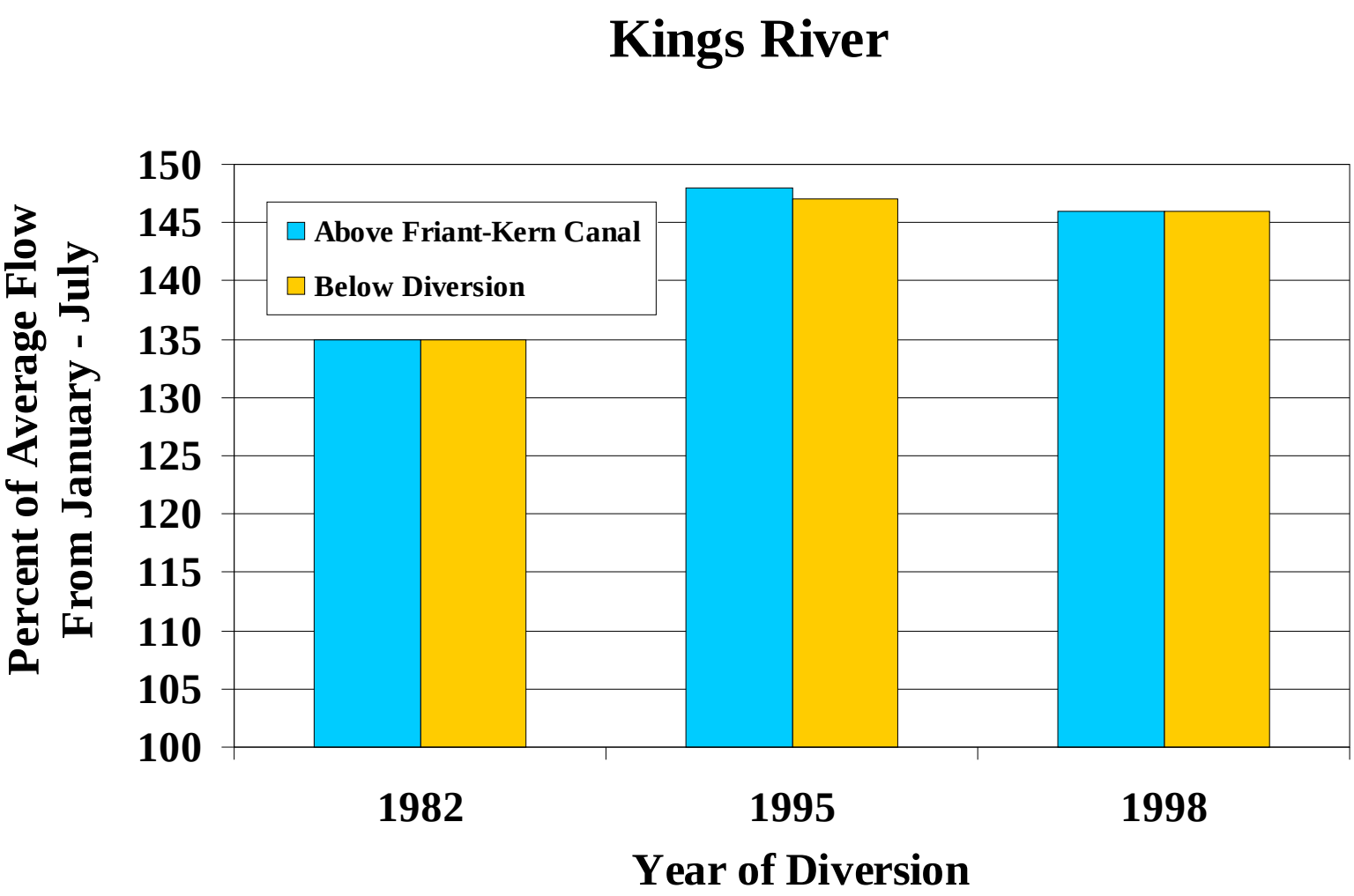
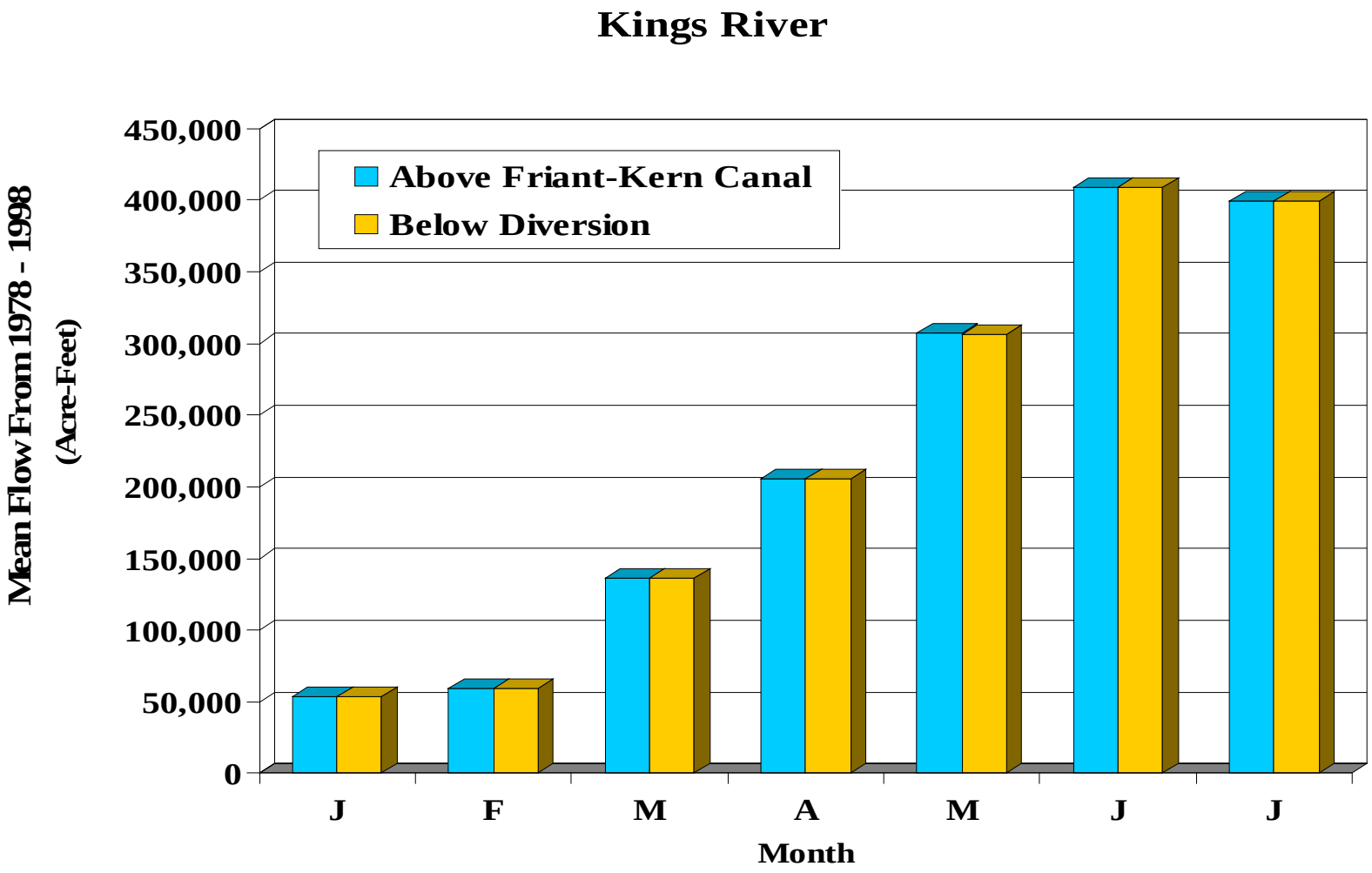


Figure 13 A comparison of mean flow in the Kings River upstream and downstream from the pump station. The chart depicts mean flow in af for the months January through July for the period 1978 through 1998.



* Differences within all months less than significant (Paired t-test, P >0.05)

Kaweah River Non-Project Water has been pumped from the St. Johns River into the FKC in six different years between 1978 and 1998: 1978, 1982, 1983, 1986, 1997 and 1998. Flood flows above the diversion point ranged from a low of 262,700 af in 1982 to 620,625 af in 1983 (Figure 14).

A monthly analysis of January through July flow volumes in the Kaweah River for the period 1978 through 1998 shows that, upstream from the point of diversion, average monthly flow volumes ranged from 19,916 af in January to 44,895 af in June. Downstream from the point of diversion, the range was 16,198 in January to 43,456 af in June (Figure 15). During those years, the greatest average monthly difference occurred during the month of May, when flows downstream from the point of diversion were decreased by 4,741 af (16.16 percent).

Tule River Between 1978 and 1998, Non-Project Water was pumped from the Tule River in four years: 1980, 1983, 1997 and 1998. Diversions from the Tule River have been variable with respect to average flow measurements above and below the point of diversion. In each of those years, during the months January through July, flows in the Tule River upstream from the point of diversion ranged from 195 percent of average (1980) to 470 percent of average (1983). By comparison, the same variable measured downstream from the point of diversion shows flows ranging from 188 percent of average (1980) to 339 percent of average (1983) (Figure 16). In the Tule River, the two greatest decreases in annual flow caused by introductions occurred in 1983 and 1998, yet during those years the percent of average flows below the point of diversion remained well above average at 339 and 242 percent, respectively.

A monthly analysis of January through July flow volumes in the Tule River for the period 1978 through 1998 shows that, upstream from the point of diversion, average monthly flow volumes ranged from 8,303 af in May to 17,136 af in March. Downstream from the point of diversion, the range was 6,619 af in May to 14,227 af in March (Figure 17). During those years, the greatest average monthly difference occurred during the month of March, when flows downstream from the point of diversion were decreased by 2,909 af (16.98 percent).

Figure 14 Comparisons of the percent of average flow in the Kaweah (St. Johns) River upstream and downstream from the pump station. The chart depicts the percent of average flow for the months January through July during years in which introductions by the District occurred. The percent of average was based on flows from January through July for the years 1978 through 1998.

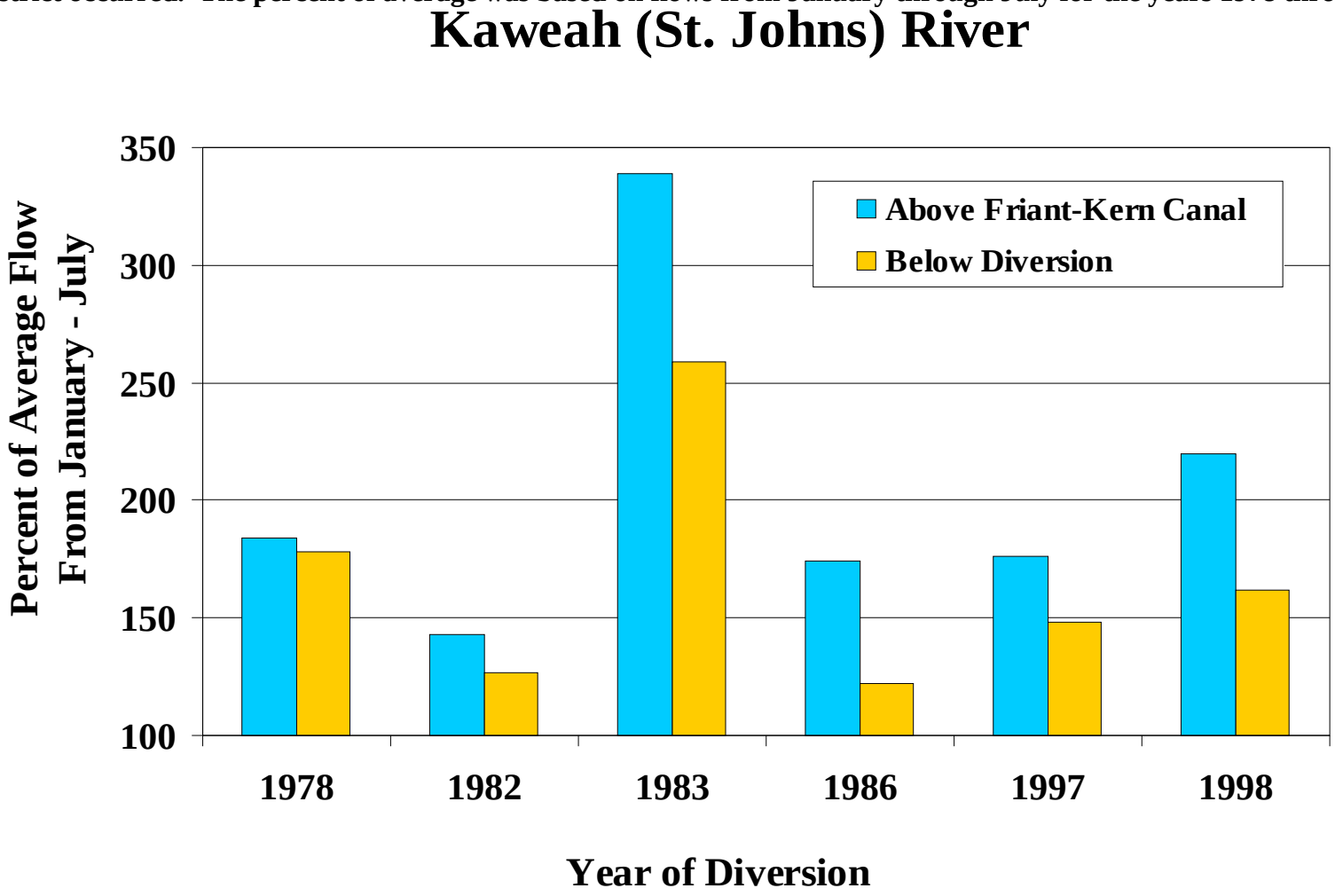
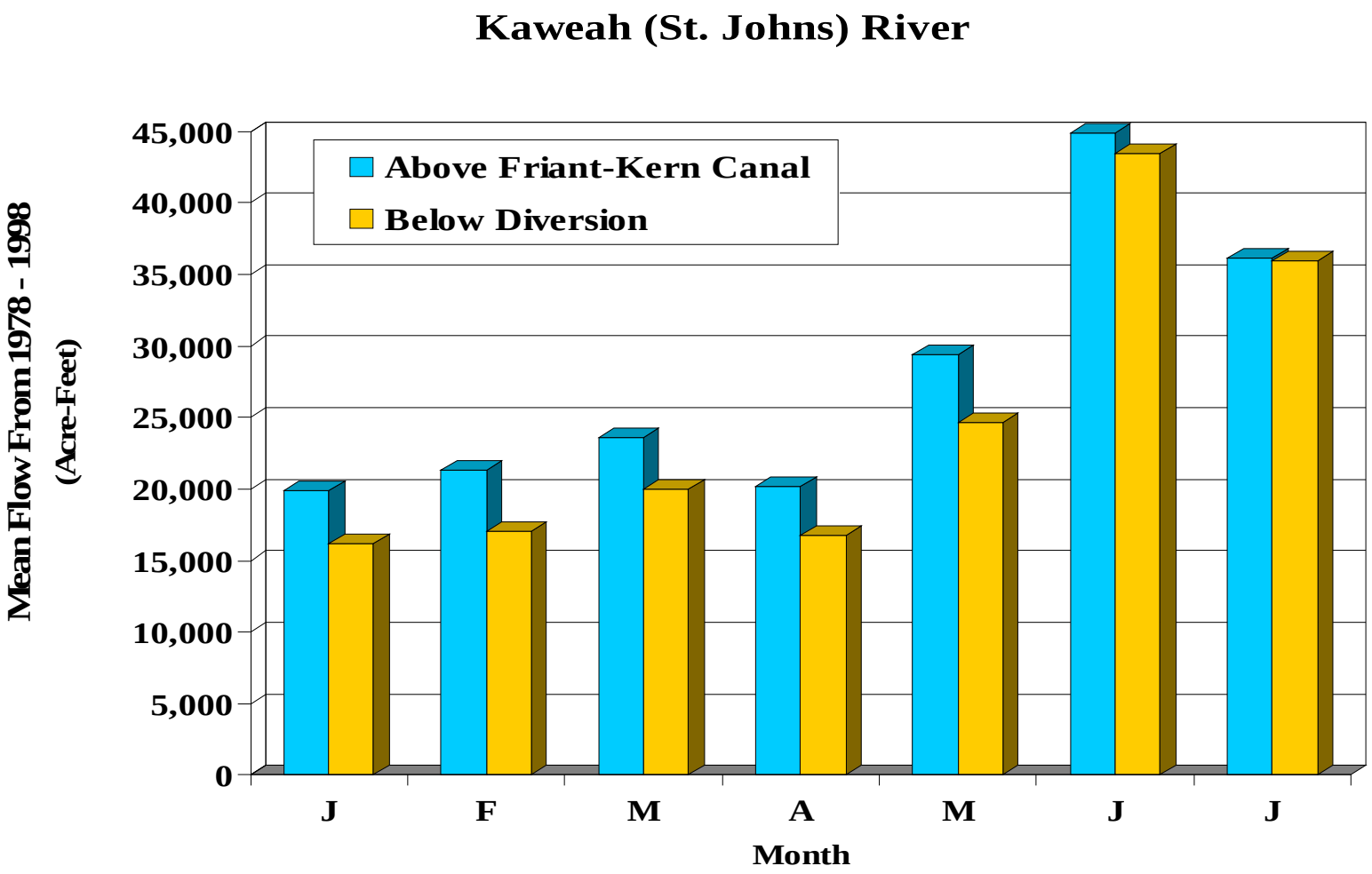


Figure 15 A comparison of mean flow in the Kaweah (St. Johns) River upstream and downstream from the pump station. The chart depicts mean flow in af for the months January through July for the period 1978 through 1998.



* Differences within all months less than significant (Paired t-test, P > 0.05)

Figure 16 A comparison of percent of average flow in the Tule River upstream and downstream of the pump station. The chart depicts the percent of average flow for the months January through July during years in which introductions by the District occurred. The percent of average was based on flows from January through July for the years 1978 through 1998.

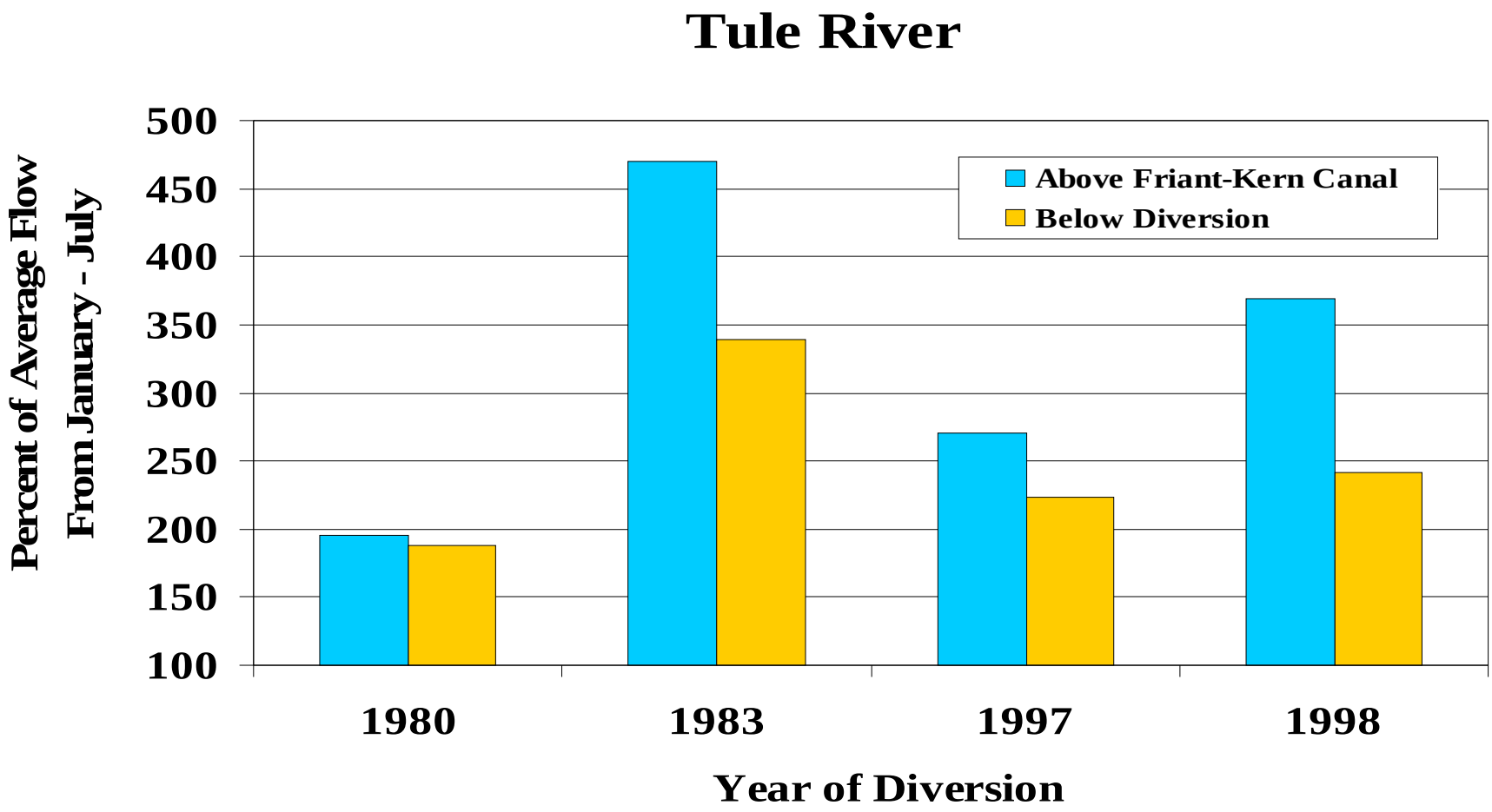
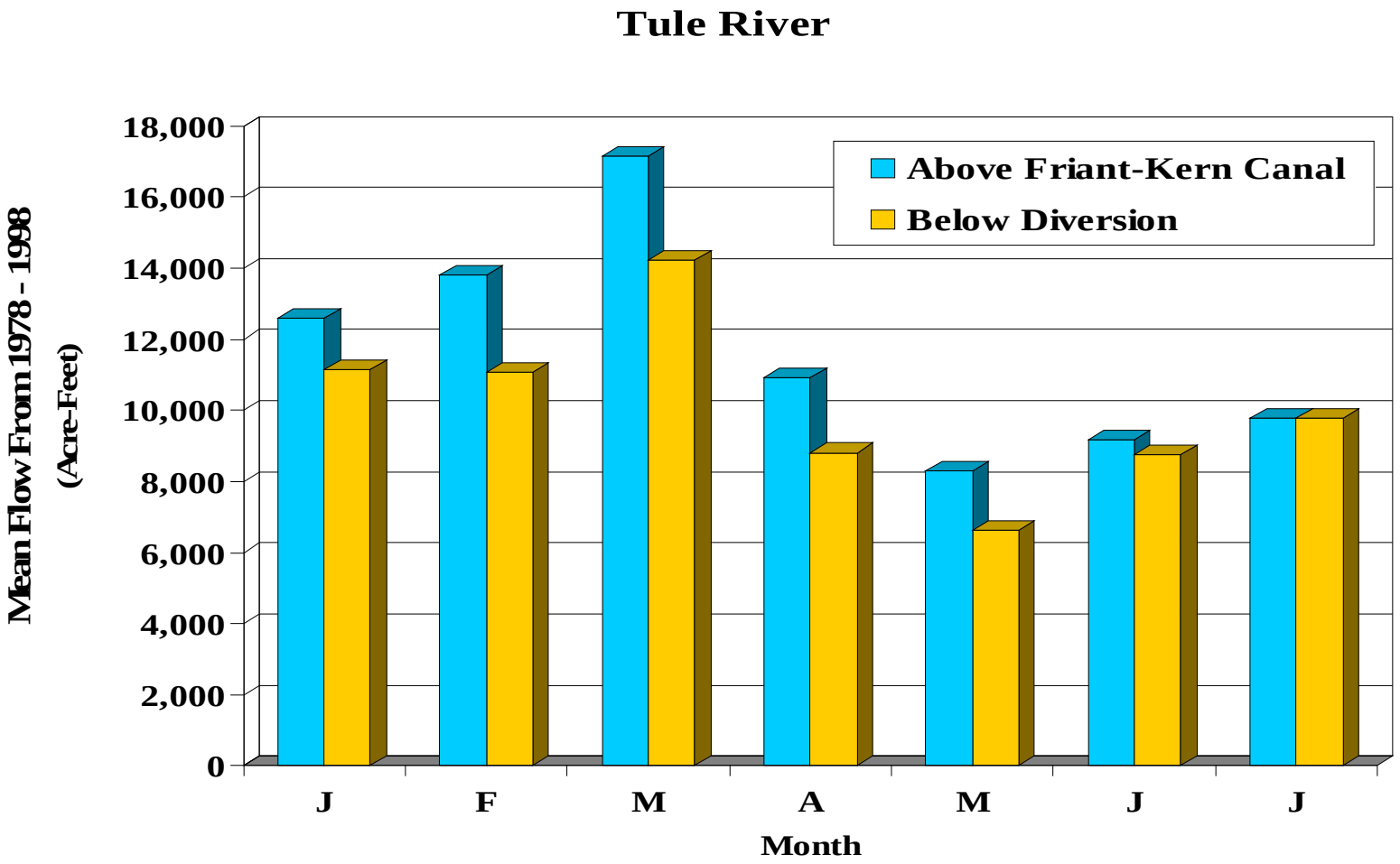


Figure 17 A comparison of mean flow in the Tule River upstream and downstream from the pump station. The chart depicts flow in af for the months January through July for the period 1978 through 1998.



* Differences within all months less than significant (Paired t-test, P >0.05)

Floodwater Volumes Introduced Under Previous Contracts

The volume of Non-Project Water that can be conveyed is limited by five factors:

1) the amount of floodwater in the river systems under Corps's flood control criteria for operations of Pine Flat, Terminus and Success dams;
2) coordination with Kings, Kaweah and Tule River basin water users;
3) the capacity of the District's pumping facilities;
4) the unfilled volume, up to capacity, that Reclamation has available in the FKC; and
5) the capacity in the Kern River to take additional flows.

A total volume of approximately 691,414 af of Non-Project Water was introduced under previous contracts with the District between 1978 and 1999 (Table 3). Non-Project Water was introduced in eight of the 22 years. Non-Project Water was introduced, on average, every three years. In four of the eight years, Non-Project Water was pumped from only a single river in any given year. In the remaining four years that Non-Project Water were pumped, water was pumped from two rivers within the same year in three years, and from all three rivers only once within a single year (Table 3). Total volumes pumped in a single year averaged 86,427 af (n = 8, range 5,100 to 248,100).

Table 3 January through July flows within the Kings, Kaweah and Tule rivers and the amount of flow pumped during years the District held contracts.

Year	Kings River				Kaweah (St. Johns) River				Tule River				Total Flow Pumped (af)
	Flow Above Friant-Kern Canal (af)	Percent of Average Flow	Flow Pumped (af)	Percent of Flow Pumped	Flow Above Friant-Kern Canal (af)	Percent of Average Flow	Flow Pumped (af)	Percent of Flow Pumped	Flow Above Friant-Kern Canal (af)	Percent of Average Flow	Flow Pumped (af)	Percent of Flow Pumped	
1978	2,140,081	144	0	0	336,674	184	9,100	3	91,296	120	0	0	9,100
1979	1,535,935	103	0	0	124,484	68	0	0	30,664	40	0	0	0
1980	2,232,880	150	0	0	361,952	197	0	0	148,948	195	5,100	3	5,100
1981	1,106,439	74	0	0	62,889	34	0	0	25,148	33	0	0	0
1982	2,009,059	135	3,200	0.16	262,700	143	29,300	11	94,663	124	0	0	32,500
1983	3,220,284	217	0	0	620,625	339	148,300	23	358,680	470	99,800	28	248,100
1984	1,527,535	103	0	0	149,094	81	0	0	66,173	87	0	0	0
1985	1,250,175	84	0	0	97,431	53	0	0	37,501	49	0	0	0
1986	2,383,604	160	0	0	318,207	174	93,985	30	142,050	186	0	0	93,985
1987	1,006,301	68	0	0	41,616	23	0	0	11,999	16	0	0	0
1988	790,207	53	0	0	39,168	21	0	0	7,174	9	0	0	0
1989	841,715	57	0	0	59,412	32	0	0	6,920	9	0	0	0
1990	615,764	41	0	0	33,683	18	0	0	0	0	0	0	0
1991	846,835	57	0	0	77,438	42	0	0	7,690	10	0	0	0
1992	658,591	44	0	0	36,241	20	0	0	329	0.43	0	0	0
1993	1,549,026	104	0	0	218,262	119	0	0	77,041	101	0	0	0
1994	926,438	62	0	0	50,681	28	0	0	8,159	11	0	0	0
1995	2,196,656	148	12,700	0.58	322,118	176	0	0	104,938	137	0	0	12,700
1996	1,782,392	120	0	0	168,865	92	0	0	6,866	9	0	0	0
1997	2,165,810	146	0	0	322,585	176	50,903	16	207,258	271	36,443	18	87,346
1998	2,171,973	146	1,003	0.05	403,535	220	106,461	26	281,963	369	95,119	34	202,583

Source: January through July flow data derived from annual reports published by the watermaster's office on each river. Volumes pumped provided by Delta Lands Reclamation District 770.

District Flood Management

Damaging flows into the Tulare Lakebed can occur anytime releases are required, (primarily from Success and Terminus dams), that exceed irrigation and spreading demands in the Tulare Lake basin. The entities that farm the Tulare Lakebed have an extensive levee, distribution and storage system designed to manage flood flows from the four projects and the surrounding uncontrolled drainage areas when necessary. However, when inflows into the lakebed exceed the capacity of the distribution system or storage facilities, productive agricultural lands, businesses and infrastructure such as roads can be flooded (Corps 1999).

When the District makes the decision to pump Non-Project Water into the FKC, it is done based on projections of reservoir operations and the dynamics of the watershed and river systems. The District analyzes the data available and tries to determine what water volume will be flowing down the rivers into the lakebed in the near future. The snow pack and the rainfall are evaluated to estimate when the upstream reservoirs will fill up. This information is analyzed to determine when it will be optimal for diversion into the FKC. The District also estimates when the Corps will require releases to meet reservoir flood control requirements. The District is aware that due to flood control requirements, releases, even when there hasn't been a recent rainfall event, are required to make room in the reservoir for future potential rain flood or snowmelt runoff. These reservoir releases also potentially could cause flooding in the Tulare Lakebed if they are significant enough in volume and duration.

Once Non-Project Water inundates farmland in the Tulare Lakebed, the inundated section cannot be farmed in that same year. The soils in the area are heavy clay soils and the percolation, if there is any, is very slow. Dewatering occurs through evaporation which is also slow, and the utilization of the water for the irrigation of fields that were not flooded (Moss pers. comm. 2007.)

The District can store approximately 100,000 af in and around the lakebed without flooding farmland. When there is an imminent threat of flooding, areas of lower productivity are flooded first, while the more productive land, protected by levees, remains in production. As more Non-Project Water arrives, more productive land is inundated. Diversion of a relatively small amount of Non-Project Water into the FKC has made the difference as to whether it is necessary to flood a large "cell" consisting of thousands of acres. Timing has also come into play. Flood flows have been pumped to allow a crop to be harvested before inundation or a newly planted crop (with the ancillary investment) to be protected while inundating a field that has not yet been planted. The diversion of these flood flows, even a small percentage of the total flood flows, has had a positive impact on production and therefore on economics as well (Moss pers. comm. 2007).

The Friant Division

The Friant Division of the CVP includes facilities to collect and convey water from the San Joaquin River. The purpose is to provide a supplemental water supply to areas along the east side of the southern San Joaquin River Basin and the Tulare Basin on an irrigation crop demand pattern. The delivery of CVP water to this region augments groundwater and local surface water supplies in an area that has historically been subject to groundwater overdraft. The Friant Division is an integral part of the CVP, but is hydrologically independent and therefore operated separately from the other divisions of the CVP (Reclamation 1999). Major facilities of the Friant Division include Friant Dam and Millerton Lake, the Madera Canal and the FKC. The FKC serves over 800,000 acres of farmland and communities in four counties. Family farms are most common. The main crops are cotton, vineyard, citrus, olives and other deciduous fruit trees.

Water for the Friant Division is pumped from the San Joaquin River at Millerton Lake. Millerton Lake has a storage capacity of 520,000 af. From there, water is released from the reservoir to the 152-mile long FKC flowing south to the Kern River. The FKC is an earthen and concrete-lined structure operated by the FWA.

Water conveyed to the 28 long-term contractors of Friant Division is categorized as either "Class 1" or "Class 2" water depending on its reliability. "Class 1" water is defined as the quantity of water that would be delivered in a typical water year. It may be used for either irrigation or M&I purposes. The "Class 1" total water delivery quantity is announced each year for the entire Division with each contractor receiving a prorated contractual amount called an allocation. "Class 2" water is delivered each year based on the available supply after 100 percent of the "Class 1" contractual requirements have been met. "Class 2" water is less reliable and the full contract amount is available only during the wettest water years. The total "Class 1" water supply under contract is 800,000 af. "Class 2" water is available as hydrologic conditions permit and the maximum available under contract is approximately 1,400,000 af.

Water Use in the Friant Division

The Friant Division was authorized by Congress under the concept of conjunctive use where the CVP water was meant to be a supplemental supply to alleviate groundwater overdraft in the area. Based on the conjunctive use concept within the Friant Division, contractors are expected to continue mixed use of CVP and other surface water supplies and groundwater, with greater emphasis on groundwater use during dry periods when surface water is limited or expensive and percolate excess surface water in wet years.

Friant and Cross Valley Contractors

Arvin-Edison Water Storage District (AEWSD) AEWSD is located in Kern County in the southeasterly portion of the San Joaquin Valley. AEWSD entered into its first long-term

renewable contract with Reclamation in 1986 for 40,000 af of Class 1 and 311,675 af of Class 2 water.

The CVP class 2 water supplies for AEWSD comprise a large fraction of their CVP contract allocation, but these supplies are variable. AEWSD manages this supply by using a groundwater reservoir underlying the district to regulate water availability and make supplies more stable. In addition, AEWSD engages in "Article 5 exchanges" of CVP water with the CV Contractors. Up to 128,300 af/y of CV Contractor's CVP water is delivered to AEWSD. This water is diverted from the Delta through the California Aqueduct (Aqueduct) and to the Cross Valley Canal (CVC). In exchange, the Friant CVP water that would have flowed down the FKC to AEWSD is diverted from the FKC by the CV Contractors. Due to the variances in allocations of Friant CVP water, these exchanges may not balance out each year. However, over the long-term the amounts of water were expected to be equal. Two of the CV Contractors have terminated their exchange arrangements with AEWSD resulting in approximately 70,984 af/y maximum delivered to the remaining six CV Contractors and approximately 66,096 af/y of water returned to AEWSD.

AEWSD takes Friant CVP water from a turnout located at the terminus of the FKC. AEWSD has 45 miles of lined canals and 170 miles of pipeline. AEWSD maintains three spreading basins to percolate water into the aquifer for storage. Gravity and pressure fed ponds are filled from surface water supplies in "wet" years, while groundwater wells are used to extract stored water in "dry" years. The safe yield of the groundwater supply is 89,900 af.

In 1997, AEWSD entered into a 25-year agreement with the Metropolitan Water District of Southern California (MWD), in which the District agreed to bank approximately 250,000 af/y of MWD State Water Project (SWP) Supply in the groundwater aquifer for later extraction in drought years. AEWSD has completed construction of an Intertie pipeline connecting the terminus of its canal to the Aqueduct to enhance its water banking and exchange program. The Intertie pipeline does not create new or additional contractual supplies.

AEWSD has historically delivered an average of less than 2,000 af/y of non-CVP water to two urban customers, East Niles Community Service District and Sycamore Canyon Golf Course.

Chowchilla Water District (CWD) CWD's 65,000 irrigated acres are all irrigated with CVP water. The district receives an average of 125,000 af/y of CVP water. The total CVP contract total allocated for the district is 265,000 af of water annually under two contracts. CWD maintains and operates 160 miles of unlined canals and 46 miles of pipe for agricultural water delivery. The primary way that the district gets its water is through the Madera Canal and the Fresno River. The district serves no municipal or industrial customers.

City of Lindsay (Lindsay) Lindsay is located on the east side of the San Joaquin Valley in Tulare County near the base of the Sierra foothills and has falling grade from east to west. In 1958, Lindsay entered into a long-term water service contract with Reclamation for 2,500 af/y of Class 1 Friant water under contract number 5-07-20-W0428. Lindsay receives up to 50 af/y of CVP water under its contract with County of Tulare. Lindsay, among others, is in a process to have their portion of the County of Tulare's contract assigned directly to them. This would mean they would have a direct relationship with Reclamation rather than having a subcontract. This process is expected to be complete sometime in the 2009 Contract Year.

Lindsay obtains their CVP water from the Friant-Kern Canal at the Honolulu Street turnout. The water treatment plant is at the same location and provides filtration, chemical additions and chlorination.

City of Orange Cove The City of Orange Cove has a CVP water service contract for 1,400 af used for M&I purposes.

County of Fresno The County of Fresno has a CVP water service contract for 3,000 af. The County of Fresno currently serves this water to a County special district – County Service Area #34 who utilizes the supply for M&I purposes. Fresno County draws their water directly from Millerton Lake after their CV Delta supply has been exchanged for Friant supplies.

County of Madera The county of Madera's CVP contract provides water for Hidden Lake Estates. The district is entirely municipal and is not fully built out.

Delano-Earlimart Irrigation District (DEID) DEID is located in Tulare and Kern Counties on the eastern side of the San Joaquin Valley, approximately 10 miles from the Sierra foothills. The district is comprised of 56,474 acres, of which 46,581 are irrigated. DEID serves agricultural water supplies only. March 1, 2001, DEID entered into a long-term contact with Reclamation for 108,800 af/y of Class 1 and 574,500 af/y of Class 2 water which was renewed in 2001.

DEID recharges the groundwater during "wet" years through operations with the White River channel, as well as, a small 5-acre recharge basin. In 1993, the District purchased and developed an 80-acre parcel specifically as a groundwater recharge basin. This basin has five separate cells and dual methods for introducing water to each cell from either the District's distribution system or from direct diversions out of White River. The FKC flows north-south through the District and Lake Woollomes is located adjacent to the District. Lake Woollomes is a feature of the FKC and CVP facilities. DEID does not obtain surface supplies or recreational opportunities from Lake Woollomes.

Exeter Irrigation District (EID) EID is located in Tulare County on the east side of the San Joaquin Valley, nine miles east of the City of Visalia. In 1950 EID entered into a long-term contract with Reclamation for 10,000 af/y of Class 1 and 19,000 af/y of Class 2 water. In 1953, the Class 1 water supply was increased to 11,500 af by an amendment to the contract which was renewed in 2001. The City of Exeter is located within EID. However, EID serves only agricultural water. EID maintains two small balancing or regulating reservoirs with a capacity of less than one af each. Yokohl Creek is an intermittent stream which traverses through the northern portion of the district in a northwesterly direction for approximately 2 miles.

Fresno County Waterworks #18 (FCWW #18) FCWW#18 has a CVP water service contract supply of 150 af which is delivered for M&I purposes.

Fresno Irrigation District (FID) A significant improvement in the control and management of the waters of Kings River occurred with the completion of the Pine Flat Dam project by the Corps in 1954. Although built primarily as a flood control project, Pine Flat Dam provides significant water storage and regulation of irrigation water to the 28 water right entities on Kings River including FID. FID has a contract for 11.9 percent of the 1,000,000 af capacity of Pine Flat Reservoir. While FID is entitled to approximately 26 percent of the average runoff of Kings River, much of its entitlement occurs at times when it can be used directly for irrigation of crops without the need for regulation at Pine Flat.

In a normal year, FID diverts approximately 500,000 af of water and delivers most of that to agricultural users, although an increasing share of FID's water supply is used for groundwater recharge in the urban area. Depending upon hydrological conditions and Kings River flows, FID diverts water and allocates a proportional share of the water to its customers including the City of Fresno and Clovis. In addition to its entitlement from Kings River, FID has a CVP contract for up to 75,000 af of Class 2 supplies annually.

Historically, excess water applied by the farmers has percolated beyond the root zone and recharged the extensive aquifer underlying FID. Between 85 percent and 90 percent of the groundwater supply can be attributed to water imported and distributed by FID.

The conversion of agricultural lands to high-density urban uses in the expanding Fresno-Clovis metropolitan area has reduced the area for recharge from surface water. Because all municipal and industrial water is obtained by pumping groundwater, a local overdraft has developed in and around the urban area, and this situation has been exacerbated by the drought of the late 1980s and early 1990s.

FID has combined forces with the City of Fresno, the City of Clovis, the County of Fresno, and the Fresno Metropolitan Flood Control District in a cooperative effort to develop and implement

a comprehensive surface and groundwater management program. The main goal of the program involves using flood control basins for recharge during the summer when the basins are not needed to control urban storm runoff. This program also contains elements designed to protect the quality of groundwater in the area.

Garfield Water District (GWD) GWD is approximately 4 miles due north of the city of Clovis California and has a CVP contract for 3,500 af of Class 1 supplies. All water deliveries in GWD are made using piped water and the delivery amounts are metered at the end user.

Gravelly Ford Water District (GFWD) GFWD is located southwest of the City of Madera, California. The district receives an average of just over 6,000 af feet of federal water per year. This water is used in conjunction with approximately 10,000 af of water to four primary crops. The district receives its water through MID facilities and Cottonwood Creek, which is used as a conveyance mechanism.

Hill's Valley Irrigation District (HVID) HVID is located in Fresno County with a small portion located in Tulare County. In 1976 HVID entered into a long-term contract with Reclamation for 2,146 af/y which was renewed in 2001. In 1995, the contract amount was amended to 3,346 af/y. The District has historically received the CVP contract supplies through an exchange with AEWSD. In 1993 HVID, along with Atwell Island Water District entered into a contract for Cross Valley Canal water with the County of Tulare. HVID acquired an additional 954 af/y and subsequently acquired another 904 af/y from Atwell Island Water District portion of the contract. HVID serves water only to agricultural users. HVID obtains its CVP water supplies from its turnout at MP 41.15L of the FKC. The District's distribution system comprises of 10.5 miles of pipeline. Within Improvement District No. 2 are two regulating reservoirs. The Anchor Reservoir and American Reservoir have storage capacities of approximately 0.53 and 2.0 million gallons respectively. Within Improvement District No. 1 is a 15 af regulating reservoir. The district does not own groundwater extraction facilities. Therefore, individual landowners must provide their own wells to sustain irrigation during periods when HVID does not have surface water available.

HVID is another contractor who is in the process of having their portion of the County of Tulare's contract assigned directly to them. This would mean they would have a direct relationship with Reclamation rather than having a subcontract. This process is expected to be complete sometime in the 2009 Contract Year.

International Water District (IWD) IWD has a CVP water service contract supply of 1,200 af which was renewed in 2001. This water is delivered for agricultural purposes to permanent crops, mainly citrus.

Ivanhoe Irrigation District (IID) IID is located in Tulare County on the east side of the San Joaquin Valley approximately 50 miles southeast of Fresno and 8 miles northeast of Visalia. IID is generally located between the St. Johns River on the south and Cottonwood Creek on the north. As early as 1915 the lands began to be developed for agricultural uses. Water supplies for irrigation in the district were from groundwater pumping, precipitation and surface diversions from runoff on the Kaweah River. IID was formed in 1948 and has acquired private surface water rights through the Wutchumna Water Company. IID owns 7.9 shares of Wutchumna Water stock equaling approximately 3,950 af of water. In 1949, IID entered into a long-term contact with Reclamation for 7,700 af/y of Class 1 and 7,900 af/y of Class 2 water which was renewed in 2001. The district's non-CVP water supplies are diverted from the Kaweah River through the Wutchumna Ditch to the district's diversion facility and is co-mingled with the CVP supply. IID obtains its CVP water supplies through two turnouts on the FKC. The district's distribution system comprises approximately 48 miles of pipeline and three groundwater recharge areas. The three groundwater recharge areas cover approximately 15 acres and are used when surplus water is available. Approximately three miles of a portion of Cottonwood Creek is also used for recharge purposes. IID does not own or operate groundwater extraction facilities.

Kern-Tulare Water Districts (KTWD) (Merger of KTWD and Rag Gulch Water District (RGWD) as of 1/1/09)

KTWD was formed in 1974, while RGWD was formed in 1955. The two districts merged on January 1, 2009 and now have one CVP contract. With the merger of the districts, KTWD has a contract with the Bureau of Reclamation for 53,300 af of CVP water. Although KTWD is a CV Contractor of the Friant Division, its CVP supplies are physically delivered from the Delta. Due to the location of KTWD they do not have direct connection to receive its CVP water supplies from the Delta. Therefore, KTWD exchanges with AEWSD for Friant CVP water or delivers their water by reverse flow in the FKC.

KTWD's facilities consist of 12 pumping plants, four reservoirs and approximately 65 miles of pressure pipeline to deliver water upslope from the FKC. At the present time, 91 percent of all crops are irrigated using the drip or micro-sprinkler irrigation method. This high percentage of low volume irrigation practices results in a very high irrigation efficiency, which does not require spill or tailwater recovery systems. The lands in KTWD are sloping, with an average slope of 40 feet per mile, from east to west. KTWD's distribution system consists entirely of pressure pipelines.

The only known natural water resource within the boundaries is the White River and the Rag Gulch. Both of these are intermittent streams that the Districts do not own or control.

KTWD obtains their CVP water supplies as follows:

· The California Department of Water Resources (DWR) conveys water under this contract through the Aqueduct to Tupman.

· Water is then conveyed from Tupman, through the CVC, to KTWD under one of two scenarios: (1) Water is conveyed through the CVC and delivered to AEWSD. AEWSD would deliver its CVP water from Friant to KTWD at KTWD intakes off the FKC. (2) Water is conveyed through the CVC and delivered through existing facilities to the FKC. Once in the FKC, the water would be pumped upstream over checks in the FKC to satisfy demands in the FKC and a like amount of water would be delivered to KTWD through its intakes off the FKC.

Lindmore Irrigation District (LID) LID is located in Tulare County at the base of the Sierra foothills. LID was formed in 1937 and in 1948 entered into a long-term contract with Reclamation for 33,000 af/y of Class 1 and 22,000 af/y of Class 2 water which was renewed in 2001. LID lies over the Kaweah Basin. The safe groundwater yield for LID was calculated in 1987 to be 21,000 af/y. LID operates a conjunctive use program to manage surface and groundwater supplies. LID uses groundwater at the beginning of the growing season to warm the CVP water while filling the District's pipeline system. This reduces maintenance costs and leaks in the concrete irrigation pipes due to contraction of cold water. LID obtains their CVP supplies from four turnouts on the FKC between MP 88.4 and 93.2. The District's conveyance system comprises of 123 miles of pipeline and five reservoirs. The Noel, Montgomery and Brewer reservoirs are earthen-clay lined. These reservoirs are 3, 4.5, and 6.5 af in size and are used for balancing (overflow). In contrast, the 93.2E N. and the 93.2-0.1S reservoirs are 5.5 and 2.5 af in size respectively, and are concrete lined and used for balancing (equalizing).

Lindsay-Strathmore Irrigation District (LSID) LSID was formed in 1915. LSID's original imported water supply was from the Kaweah River through the District's ownership of Wutchumna Water Company stock and 39 deep wells. The supplies from the Wutchumna Water Company range from 5,000 to 14,000 af/y. LSID enters into Warren Act contracts with Reclamation to transport this water within the district using CVP facilities. The groundwater supply is limited to 18,000 af/y. In 1948, LSID entered into a long-term contract with Reclamation for 39,000 af/y of Class 1 water. In 1985, the contract amount was amended to 27,500 af/y which was renewed in 2001. The District serves only agricultural water.

LSID obtains their CVP water supplies from its turnout at MP 85.56 of the FKC. The district's distribution system is approximately 115 miles of pipeline and three balancing reservoirs. The

Main reservoir is 80 af and concrete lined. The High-Level reservoir is 5 af and concrete lined and the El Mirado reservoir is a 200,000 gallon steel tank. LSID operates five groundwater wells with a normal production of 1,750 gallons per minute. These wells are not utilized if surface water is available due to the high cost of pumping.

No usable groundwater basin underlies the district. LSID lies too far to the east against the foothills to be influenced by either the Kaweah or Tule Rivers. The district does not operate recharge areas or a conjunctive use program. LSID contractually uses the conjunctive use capacity of the Tulare Irrigation District, a common stockholder in the Wutchumna Water Company, by delivering the District's Kaweah River water through the Wutchumna Ditch to the Tulare Irrigation District turnout. Tulare Irrigation District either uses this water for irrigation (in lieu recharge) or direct sinking in their groundwater recharge basins. During "dry" years, Tulare Irrigation District's farmers utilize the groundwater delivered by LSID. Tulare Irrigation District returns surface water to LSID through either the FKC or through the Kaweah River system. LSID regularly transfers water to LID, which borders LSID on the west. Approximately 2,500 af/y is transferred to LID during normal water supply years.

Lower Tule River Irrigation District (LTRID) LTRID was formed in 1950. LTRID is located in Tulare County on the east side of the San Joaquin Valley. The district's entire distribution system is unlined earth canals. Collectively, LTRID owns or controls approximately 163 miles of canals and approximately 47 miles of river channel. The district maintains and operates 12 recharge and regulating basins, covering approximately 3,000 acres. In wetter years, LTRID uses these facilities to recharge the groundwater reservoir. LTRID does not own or control groundwater extraction facilities. Therefore, each landowner must provide privately owned wells to sustain irrigation during periods when LTRID does not have surface water available.

Currently, the water supplies in LTRID are groundwater, water rights on the Tule River, and CVP water under two separate contracts. The Tule River water supply is approximately 70,000 af/y. Tule River flows approximately 22 miles through the central part of the District. Porter Slough follows a parallel course north of the Tule River. In 1951, LTRID entered into a long-term contract with Reclamation for 61,200 af/y of Class 1 and 238,000 af/y of Class 2 Friant water which was renewed in 2001. In 1975, LTRID entered into a three-way contract with Reclamation and the DWR to provide an additional 31,102 af/y of CVP water supply. Under this three-way contract, the CVP water is diverted from the Delta, conveyed through SWP facilities via the Aqueduct to the Cross Valley Canal to AEWSD. Through the Cross Valley Canal Exchange Program, AEWSD and LTRID 'swap' CVP water supplies from the Delta and Friant facilities. The exchange agreement between AEWSD and LTRID has been terminated. LTRID may enter into similar exchange arrangements with other water districts to obtain their CVP water supplies from the Delta.

Madera Irrigation District (MID) MID receives 85,000 af/y of Class 1 and 186,000 af/y of Class 2 water from the Friant Division of the CVP. In 1975 Hidden Dam was completed on the Fresno River providing a more regulated flow. MID entered into a long-term contract with Reclamation for water from Hensley Lake behind Hidden Dam. MID annexed lands for 24,000 af/y projected average yield for new water generated by the Hidden Dam project.

MID has pre-1914 water rights of 20,000 af/y from the Soquel-Big Creek. Water supplied under the Hidden Dam contract with Reclamation is for the conservation (define) yield. The Big Creek and Soquel diversions provide an annual average supply of 10,000 and 9,700 af respectively. The Fresno River adjudicated and appropriative average annual supply is approximately 20,000 af and is inclusive of the Big Creek and Soquel diversions.

MID and surrounding area is within a groundwater deficient area as designated by the DWR. MID considers their recharge to be from percolation ponds located throughout the district. MID monitors the depth to static water level within the district although MID does not provide groundwater. Private landowners have wells and extract groundwater when surface water supplies are not available. Reclamation calculated the safe yield of the portion of the Madera Basin that underlies MID to be 117,000 af/y. The groundwater quality is considered to be of excellent quality as it does not exceed any of the maximum contaminant levels for secondary drinking water standards. However, in recent years the groundwater in areas near Hwy 99 and Avenue 12 has a plume of dibromochlorophenol (more commonly known as DBCP) that flows southwesterly through the basin. Studies conducted in 1993 indicated the DBCP in the groundwater had decreased significantly. The groundwater in areas surrounding the Tri-Valley Growers olive plant (Oberti Olives) near Avenue 13 and Road 26 contains salt brine. Tri-Valley Growers are implementing remediation measures to correct this problem under the regulatory direction of the Regional Water Quality Control Board.

A portion of the city of Madera lies within the boundaries of MID. These lands are assessed on a per square-foot basis and receive groundwater recharge benefit from canals that pass through the city. MID does not provide surface water supplies to the city of Madera.

MID is also working on the environmental documentation to develop a groundwater bank and store CVP water outside of their service area boundaries.

Orange Cove Irrigation District (OCID) OCID is located in Fresno and Tulare Counties and was formed in 1937. In 1949, OCID entered into a long-term contract with Reclamation for 31,800 af and in 1989, the contract amount was amended to 39,200 af/y of Class 1 water. The contract was renewed in 2001. The District obtains their CVP water supplies from 15 diversion points on the FKC between MP 35.87 to 53.32. OCID's distribution system is 105 miles of

pipeline and one regulating reservoir with a capacity of 8 af. OCID does not supply any M&I water. A groundwater basin is almost non-existent under OCID. The area immediately east of Smith Mountain and the area in the vicinity of Navelencia contain basin water. The majority of wells are located in this area. The safe yield has been determined to be 28,000 af/y. OCID does not operate any groundwater wells or recharge facilities due to the existing groundwater conditions. OCID provides approximately 1.4 af per acre. Therefore, the balance of crop needs are made up from precipitation and groundwater pumping. The landowners in OCID manage the groundwater supplies through conjunctive use practices. OCID transfers unused water supplies out to other districts for storage and groundwater banking. OCID is pursuing partners for a long-term transfer program or groundwater banking program to balance water in wet and dry years.

Pixley Irrigation District (PID) PID was formed in 1958. The district is an agricultural district and does not provide any water for M&I use although their contract is an Agricultural and M&I contract. PID has a CVP contractual supply of 31,102 af with an annual average delivery of 29,000 af. PID does have access to Deer Creek natural flow although this is typically a relatively small water supply. The district has 45 miles of unlined canals and utilizes 115 miles of Deer Creek channels for delivery. The district has no owned groundwater wells and the groundwater table is about 124 feet below the ground surface. PID has 11 recharge and regulating basins covering 278 ac in addition to recharge from unlined canals and river conveyance. The district also spreads water on 960 ac of Pixley National Wildlife Refuge. PID landholders pumped 39,408 af of groundwater in 2009. The Tule groundwater sub basin "safe yield" has been determined to be 32,100 af.

Porterville Irrigation District (PoID) PoID is located in Tulare County. PoID was formed in 1949. PoID entered into a long-term contract with Reclamation for 16,000 af/y of Class 1 and 30,000 af/y of Class 2 CVP water which was renewed in 2001. PoID has an entitlement of 10,000 af/y of water supply from the Tule River.

The FKC enters the District at the northeast corner and exists in the south central portion. The Tule River passes through the District in a northwesterly direction. PoID owns approximately four miles of pipeline that serves 854 acres in one Improvement District and 3.3 miles of open ditch that serves 1,266 acres in a second Improvement District.

PoID obtains their CVP supplies from six diversion points on the FKC. In addition to the District-owned facilities, PoID has entered into agreements with LTRID and other entities to utilize non-District owned facilities to convey the District's water.

Through an agreement between PoID and LTRID, CVP water deliveries are conveyed through 13 miles of unlined canals owned by LTRID within PoID.

PoID also delivers its Tule River water through facilities owned by the Porter Slough Ditch Company, the Hubbs-Miner Ditch Company, the Rhodes-Fine Ditch Company and the Gilliam-McGee Ditch Company. These facilities consist of approximately 13 miles of unlined ditch within PoID. The facilities belonging to these companies are operated by PID under long-term agreements with the entities.

PoID owns one percolation basin. In addition, PoID owns a portion of the water conservation space behind Success Dam. This storage space is used to store water rights water owned by ditch companies with which PoD has operating agreements.

PoID delivers agricultural water only.

Saucelito Irrigation District (SID) SID was formed in 1941. Deer Creek, an intermittent stream, crosses the District for about 5 miles from its southern boundary, but there are no District diversions off Deer Creek. The FKC is located on the eastern boundary of the District.

Water deliveries began in 1961 for 21,200 af/y Class 1 and 32,800 af/y of Class 2 water which was renewed in 2001. SID is also a sub-contractor of Tulare County, a Cross Valley contractor, and receives 100 af/y of the County's 5,308 af/y of CVP water. The District has five individual water users that have rights in Popular Irrigation Company of 9.5 shares at 55 acre feet per share from Mole Ditch. SID engages in exchanges with other Cross Valley contractors.

SID obtains its CVP water supplies from four diversion points on the FKC between MP 11.64 and 107.35 and Deer Creek diversion at MP 102.69. The district's distribution system is 55 miles of pipeline with one recharge pond that covers approximately ½ acre. Deer Creek also provides groundwater recharge in wet years.

SID is another contractor who is in the process of having their portion of the County of Tulare's contract assigned directly to them. This would mean they would have a direct relationship with Reclamation rather than having a subcontract. This process is expected to be complete sometime in the 2009 Contract Year.

Shafter-Wasco Irrigation District (SWID) SWID was formed in 1937 and is located in Kern County about 20 miles northwest of Bakersfield. The District entered into a long-term contract with Reclamation in 1955 for 50,000 af/y of Class 1 and 39,600 af/y of Class 2 water which was renewed in 2001. The District does not have any other long-term surface water supplies. SWID provides water for agricultural use only.

SWID obtains its CVP water supplies from two turnouts on the FKC at MP 134.4 and 137.2. The District's distribution system is 0.3 miles of lined canals and 117 miles of pipeline. SWID does

not own or operate any water storage facilities or groundwater extraction facilities. Landowners must provide wells to meet irrigation demands when SWID does not have adequate surface water supplies available. SWID has a history of transferring small amounts of water to neighboring districts.

Southern San Joaquin Municipal Utility District (SSJMUD) SSJMUD was formed in 1935 and is located in Kern County, approximately 75 miles southeast of Fresno and 30 miles northwest of Bakersfield. The District entered into a long-term contract with Reclamation in 1945 for 97,000 af/y of Class 1 and 50,000 af/y of Class 2 water which was renewed in 2001. The district does not have other long-term surface water supplies.

SSJMUD obtains its CVP water supplies from nine diversion points on the FKC between MP 119.6 and 130.4. The district's distribution system is 158 miles of pipeline. SSJMUD operates 11 regulating reservoirs that provide groundwater recharge. Poso Creek and other smaller foothill drainages also provide recharge to the groundwater. The district does not own and operate groundwater extraction facilities. Landowners must rely on well water to irrigate during times when SSJMUD does not have surface water supplies available to meet irrigation demands. SSJMUD does not typically transfer water in or out.

Stone Corral Irrigation District (SCID) SCID was formed in 1948. SCID entered into a long-term contract with Reclamation for 7,700 af/y of Class 1 water in 1950 which was renewed in 2001. In 1991, the contract was amended to 10,000 af/y of Class 1 water. SCID receives a small amount of water through exchange arrangements with CV Contractors. This amount is 950 af/y of CVP water. The safe yield for the groundwater supply in SCID is approximately 3,200 af.

The FKC runs approximately along the north and east boundaries of the District. SCID obtains the CVP water from the FKC at MP 57.90, 59.33, 60.90 and 62.68. SCID's conveyance system is 27 miles of pipeline. SCID serves only agricultural water. The main crops are citrus, cotton, deciduous and subtropical fruit trees.

Tea Pot Dome Water District (TPDWD) TPDWD was formed in 1954 and is located in southeastern Tulare County, approximately three miles south of Porterville. TPDWD relies primarily on CVP contract water supplies for irrigation.

In 1958, TPDWD entered into a long-term contract with Reclamation for 7,500 af/y of Class 1 water which was renewed in 2001. TPDWD does not have any other long-term surface water supplies. The district does not own or operate groundwater recharge or extraction facilities. Landowners pump small amounts of groundwater.

TPDWD receives its CVP water supplies from the FKC. The district's distribution system is 20 miles of pipeline.

Terra Bella Irrigation District (TBID) TBID was formed in 1915 and is located in Tulare County about 75 miles southeast of Fresno and about eight miles south of Porterville. Deer Creek flows westerly and passes through the northern portion of the district. Fountain Spring Gulch flows in a northwest direction, traversing a portion of the district. TBID provides CVP and groundwater for domestic purposes and to the town of Terra Bella. Approximately 850 af/y of CVP water is delivered for domestic, municipal and industrial uses within TBID.

TBID entered into a long-term contract with Reclamation in 1950 for 29,000 af/y of Class 1 water. This contract was renewed in 2001. TBID receives its CVP water supplies from the FKC at MP 103.64, MP 102.69 and Deer Creek to a percolation pond. The district's distribution system is 152 miles of pipeline. The district does not have any other long-term surface water supplies.

The district's deep well system is barely adequate to support small winter demands. Historically, there were a total of 83 wells drilled over the years in the District. Currently, TBID owns and operates 10 wells. Recently, TBID has lost the use of three wells due to chemical contamination. TBID's groundwater supply has been significantly depleted. There are no significant grower or landowner wells. The district uses three regulating reservoirs during the irrigation season and for storage in the winter. Station 1 has a capacity of 0.185 million gallons, Station 2 has 0.212 million gallons and Station 3 has a 1.880 million gallon capacity.

TBID has developed groundwater banking arrangements with other districts. Groundwater banking arrangements have enabled TBID, a groundwater deficient district, to produce crops during drought years. In years when surplus amounts of water are available, TBID transfers water to other districts for direct use, resale, or percolation through recharge basins. The district and LTRID have a long history of water exchanges. TBID transfers water to LTRID and, in turn, transfers water to TBID in dry years.

The District provides agricultural water, in addition to, M&I water for domestic use.

City of Fresno The City of Fresno is an M&I only contractor who utilizes their 60,000 af water service contract supply to recharge the groundwater in and around the city allowing them to withdraw groundwater on demand to serve municipal needs.

In 2005, a new surface water treatment plant was built and water is supplied to it via the Enterprise Canal.

Tri-Valley Water District (TVWD) TVWD has a CVP water service contract for 1,142 af. TVWD is in the Kings groundwater sub basin which has a "safe yield" estimated to be 1,048 af/year.

Tulare Irrigation District (TID) TID was formed in 1889 and is located in western Tulare County on the eastside of the San Joaquin Valley. TID provides only agricultural water supplies and does not service the city of Tulare. Water for Tulare is extracted from the ground and furnished through City-owned facilities.

TID entered into a long-term contract with Reclamation in 1952 for 30,000 af/y of Class 1 and 141,000 af/y of Class 2 water which was renewed in 2001. The district has pre-1914 water rights on the Kaweah River for approximately 50,000 af/y of water. The district-owned Kaweah River water rights are 1) Crocker Cut on the Lower Kaweah Branch, 2) St. Johns Canal (TID) on the St. Johns Branch and 3) Crossmore Cut (Packwood Creek) on the St. Johns Branch. Water is also made available through share holdings in the following Kaweah River agencies: 1) Tulare Irrigation Company on both the Lower Kaweah Branch and the St. Johns Branch, 2) Evans Ditch Company on both the Lower Kaweah Branch and the St. Johns Branch, 3) Wutchumna Water Company on the Kaweah River, 4) Persian Ditch Company, and 5) Consolidated Peoples Ditch Company. Groundwater recharge occurs from percolation in the canals and natural channels, and treated municipal and industrial effluent. TID has 12 groundwater recharge areas covering a total of 1,110 acres. The district does not operate extraction wells. TID has an existing agreement for LSID to store groundwater and surface water supplies.

TID obtains their CVP water supplies from its turnout which is located approximately 14 miles northeast of the district's service area. The water is conveyed in the district's Main Canal. Diversions into this Main Canal include water from the Kaweah and St. Johns River Branch. The Packwood Creek diversion system begins at the terminus of the Lower Kaweah River approximately 10 miles northeast of TID. The district's distribution system includes 300 miles of unlined canals, ¼ mile of lined canal and 30 miles of pipeline.

Kern River

The Kern River is located at the southern terminus for the 152-mile long FKC and serves as the discharge point of any canal water not pumped from the canal. The upper watershed of the Kern River includes the South Fork of the Kern River and the main stem of the Kern River. The Kern River watershed is smaller than the San Joaquin River's water shed. It spans about 2 to 3 million acres.

The main stem of the river flows south through the mountains and directly into Lake Isabella. Downstream from the lake, the river flows southwest toward Bakersfield, where it enters the valley floor and continues in a westerly direction. Isabella Dam is the main regulating facility on

the Kern River and is used for flood management and water supply. Isabella Dam provides flood protection to the City of Bakersfield, the developed agricultural areas downstream from the dam and the Tulare Lakebed.

The Isabella Dam was built with a gross pool capacity of 568,000 af and a flood management reservation of 398,000 af. The dam has an auxiliary dam 100-feet high and 3,257-feet long that is operated to reduce flood flows to a downstream maximum release rate of 4,600 cfs (Corps 1999). Efforts by the water user agencies served by Isabella Lake have made it possible to release the flow rate of 4,600 cfs downstream without any of the flow reaching the Kern River Intertie or the Tulare Lakebed (Corps 1999). (The Kern River Intertie is a connection between the Kern River and the California Aqueduct allowing water in the Kern River to be pumped into the Aqueduct and delivered to southern California.)

Isabella Dam is also part of a four-reservoir system contributing water to the Tulare Lakebed region. Since the Kern River has no outlet to the ocean, all flows released from Lake Isabella must be used or disposed of within the service area or conveyed into the California Aqueduct through the Kern River Intertie or it will enter the Tulare Lakebed and may cause damage (Corps 1999).

Increased flooding from the Kern River is likely in the near future. Seepage problems have been identified at Lake Isabella causing a reduction in the maximum allowable level of the reservoir. Lower reservoir levels means less capacity to absorb flood flows from the watershed and therefore causes larger releases and flood volumes.

Non-Project Water introduced into the FKC and discharged into the Kern River has historically been used by entities pumping from the Kern River (KRSA) or conveyed into the California Aqueduct.

Use of Floodwater

Maximum introductions of 248,100 af in 1983 and 202,583 in 1998 were in response to record setting wet seasons. Non-Project Water pumped under previous contracts has been accepted into the Kern River based on the available capacity of the Kern River typically during Isabella Reservoir flood release operations. The availability of Kern River floodwater dictates the extent past District Warren Act floodwater is used in the Kern Basin. If all of the Basin's irrigation and spreading (recharge) demands are satisfied by Kern River water, any District Warren Act floodwater introduced in the Kern River has been pumped into the Aqueduct (when Kern Intertie capacity and SWP demand exists).

Historically, most of the Non-Project Water that was introduced into the Kern River ended up being pumped into the Aqueduct. Kern River flood releases have generally been occurring at the

same time as the District was pumping into the FKC. During flood operations, the Kern River water interests insist that Kern River water be used in the Basin and Non-Project Water is not used until all the available Kern River water has been used. This has resulted in the Non-Project Water being conveyed to the Aqueduct. For example, in 2006, essentially all of the Non-Project Water from the FKC abandoned into the Kern River was subsequently pumped into the Aqueduct.

Flow in the river channel in excess of the Kern River Basin's irrigation and spreading demands triggers the operation of the Kern Intertie facility. It could be either Kern River flood release water or Non-Project Water that is the first water pumped into the Aqueduct. When there are excess flows in the river channel, the Kern River interests coordinate the operation of the Intertie facility with the Department of Water Resources (DWR) (See Table 4). This coordination is necessary because DWR typically reduces the pumping at the Delta by an amount that matches the Intertie flow. DWR then delivers the Intertie flow as project water to contractors in Kern County and Southern California.

When floodwater has been diverted by entities in the KRSA, (see Appendix A for a complete list of potential pumpers from the Kern River), the floodwater was used for recharge and irrigation purposes. Kern Basin rechargers would include the City of Bakersfield, the Pioneer Project and the Kern Water Bank. The water banks have used this District Warren Act floodwater initially to meet their obligation to put water into their aquifers for recharge and not under a water bank account name to assuage third party impacts. Most banks have a commitment to leave a percentage, usually about 10 percent, in the ground to address the concerns of their neighboring groundwater users. These flood flows have been utilized to supply this 10 percent buffer supply.

In years when spreading facilities and District flood flows were still available after satisfying the buffer supply these water banks had the opportunity to pump the water in the name of the project participants. Groundwater banking project participants have used their banked supplies mainly to firm up supplies for existing urban development and existing agricultural production.

In the past some of the flood flow in the canal has been marketed to CVP and other contractors to augment recharge efforts. Additionally, not all water pumped into the canal was discharged into the Kern River due to canal conveyance losses (Table 5). Over the last ten years the flood flows entering the canal were reduced by approximately 42 percent before they are discharged into the Kern River. Discharges from the FKC into the Kern River typically made up about 14 percent of the river's flow downstream of the FKC during potential flood discharge events.

Table 4 DELTA LANDS RECLAMATION DISTRICT NO. 770
FKC FLOODWATER PUMP-IN PROGRAM
1997, 1998, & 2006 OPERATIONS

	DLRD Floodwater Diversions into Friant-Kern Canal	Releases from Isabella Reservoir	Friant-Kern Inflow to Kern River			Total Kern River Flow	Diversions into Calif. Aqueduct		
			Other	DLRD	Total		DLRD	Kern River	Total *(a)*
					(3) + (4)	*(2) + (5)*			*(7) + (8)*
1997									
Jan	37,449	63,352	49,739	37,449	87,188	150,540	21,236		21,236
Feb	46,241	142,831	-	37,608	37,608	180,439	26,222	1,793	28,015
Mar	3,656	158,678				158,678			
Apr		95,933				95,933			
May		120,789				120,789			
Jun		133,315				133,315			
Jul		133,724				133,724			
Aug		108,452				108,452			
Sep		55,240				55,240			
Oct		42,278				42,278			
Nov		46,977				46,977			
Dec		31,894				31,894			
Total	**87,346**	**1,133,463**	**49,739**	**75,057**	**124,796**	**1,258,259**	**47,458**	**1,793**	**49,251**

Table 4 DELTA LANDS RECLAMATION DISTRICT NO. 770
FKC FLOODWATER PUMP-IN PROGRAM
1997, 1998, & 2006 OPERATIONS

	DLRD Floodwater Diversions into Friant-Kern Canal	Releases from Isabella Reservoir	Friant-Kern Inflow to Kern River			Total Kern River Flow	Diversions into Calif. Aqueduct		
			Other	DLRD	Total		DLRD	Kern River	Total *(a)*
					(3) + (4)	*(2) + (5)*			*(7) + (8)*
1998									
Jan		45,636				45,636			
Feb	873	93,987	9,608		9,608	103,595			
Mar	35,927	97,468	-	18,967	18,967	116,435			
Apr	72,920	132,317	-	46,408	46,408	178,725	40,839	3,118	43,957
May	48,639	239,423	-	13,838	13,838	253,261	13,838	48,614	62,452
Jun	40,040	284,408	-	264	264	284,672	264	68,477	68,741
Jul	5,693	239,607	9,828	2,786	12,614	252,221	2,786	10,017	12,803
Aug		200,713	-			200,713			
Sep		114,224	-			114,224			
Oct		89,980	-			89,980			
Nov		93,054	-			93,054			
Dec		31,739	15,267		15,267	47,006			
Total	**204,092**	**1,662,556**	**34,703**	**82,263**	**116,966**	**1,779,522**	**57,727**	**130,226**	**187,953**

Table 4 DELTA LANDS RECLAMATION DISTRICT NO. 770
FKC FLOODWATER PUMP-IN PROGRAM
1997, 1998, & 2006 OPERATIONS

	DLRD Floodwater Diversions into Friant-Kern Canal	Releases from Isabella Reservoir	Friant-Kern Inflow to Kern River			Total Kern River Flow	Diversions into Calif. Aqueduct		
			Other	DLRD	Total		DLRD	Kern River	Total *(a)*
					(3) + (4)	*(2) + (5)*			*(7) + (8)*
2006									
Jan		55,783	24,927		24,927	80,710			
Feb		32,313	-		-	32,313			
Mar		24,899	6,691		6,691	31,590			
Apr		49,966	68,296		68,296	118,262			
May	25,326	273,669	-	24,135	24,135	297,804	24,135	60,932	85,067
Jun	3,970	258,061	1,296	3,969	5,265	263,326	3,969	12,479	16,448
Jul		157,823			-	157,823			
Aug		86,747			-	86,747			
Sep		45,725			-	45,725			
Oct		22,006			-	22,006			
Nov		20,484			-	20,484			
Dec		18,660			-	18,660			
Total	**29,296**	**1,046,136**	**101,210**	**28,104**	**129,314**	**1,175,450**	**28,104**	**73,411**	**101,515**

(a) Limited "Other" Friant-Kern Canal inflows to the Kern River may not be included.

Table 5 Pump-in Quantity, Canal Losses and Kern River Flows

Year and Month of Pump-in	AF Reduced During Transport in FKC	Percent Reduction Btwn pump-in volume and volume discharged into Kern River	DLRD Discharge into Kern River as a percentage of the Kern River Release Flows
01/97	0 af	0 % reduction in the canal	59%
02/97	8,792 af	19 % reduction in the canal	26%
03/97	3,656 af	100% reduction in the canal	0%
02/98	873 af	100% reduction in the canal	0%
03/98	16,960 af	47% reduction in the canal	19%
04/98	26,512 af	36% reduction in the canal	35%
05/98	34,801 af	72% reduction in the canal	6%
06/98	39,776 af	99% reduction in the canal	0.1%
07/98	2,907 af	51% reduction in the canal	1%
05/06	1,191 af	5% reduction in the canal	9%
06/06	1 af	0% reduction in the canal	2%
Average	**12,315 af**	**42% reduction in the canal**	**14%**

Water Quality

Water quality in the FKC canal is pristine as it emanates from snow melt from the granitic Sierra Nevadas. Salinity measured as TDS typically averages about 50 mg/L. No constituents in this water supply limit its use. See Appendix E for water quality sampling data at both Friant Dam and downstream within the canal at Lake Woollomes.

Although water in the three affected rivers also originates in the Sierra Nevadas and therefore the water quality is also normally pristine, the water quality during flood events can be degraded due to additional erosion due to the scouring force of the flood events. Tables 6 through 8 provide water quality data from the three rivers during pump-in events. Note that during these pump-in periods the turbidity, TDS, alkalinity, bicarbonate conductivity and coliform concentrations are all elevated above the values in the FKC canal at the time of the pump-in events.

Table 6 Kings River Water Quality on Pump-in Dates

Sample Date	**Turbidity NTU**	**TDS mg/L**	**Alkalinity mg/L**	**Bicarbonate Mg/L**	**Conductivity µmhos/cm**	**Aluminum mg/L**	**Iron mg/L**
5/18/06	1.9	ND	20	30	-	0.08	0.11
5/25/06	1.7	30	20	20	39	-	-
Average	1.8	15	20	25	39	0.08	0.11
FKC Data 1	0.9	ND	10	20	25	-	-

TDS = Total Dissolved Solids
ND = Non-detect
Notes: 1) Data immediately upstream of Kings River pump-in station

Table 7 Kaweah River Water Quality on Pump-in Dates

Sample Date	Turbidity NTU	TDS mg/L	TSS mg/L	Total Coliform MPN/100 ml	Fecal Coliform MPN/100 ml
1/9/06	6.1	-	-	900	23
1/15/06	5.0	-	-	-	-
4/3/06	4.0	-	-	900	50
4/14/06	6.1	-	-	500	50
4/21/06	4.3	70	ND	500	30
4/28/06	4.7	70	ND	110	30
Average	5.0	70	ND	582	37
FKC Data 1	3.8	30	ND	110	13

TDS = Total Dissolved Solids
ND = Non-detect
MPN/100 ml= Most Probable Number per 100 milliliter
Notes: 1) Data immediately upstream of Kaweah River pump-in station

Table 8 Tule River Water Quality on Pump-in Dates

Sample Date	Turbidity NTU	TDS mg/L	TSS mg/L	Total Coliform MPN/100 ml	Fecal Coliform MPN/100 ml
1/9/06	6.9	-	-	1,600	30
1/15/06	7.1	-	-	-	-
4/3/06	5.8	-	-	900	300
4/14/06	12.4	-	-	900	130
4/21/06	7.2	110	ND	500	30
4/28/06	10.4	110	ND	300	50
Average	8.3	110	ND	840	108
FKC Data 1	4.0	30	10	167	22

TDS = Total Dissolved Solids
ND = Non-detect
Notes: 1) Data immediately upstream of Tule River pump-in station

Groundwater Recharge

Groundwater overdraft and the potential resulting land subsidence are prevalent in the southern two-thirds of the Central Valley. Currently all basins in this region are in overdraft conditions. During drought, as surface supplies dwindle and carryover storage in reservoirs is not replaced, groundwater pumping increases. The number of new wells drilled doubled during the drought between 1987 and 1992 over the normal well drilling (DWR 1994). Allocations of Friant Division CVP supplies from the FKC were greatly reduced in the drought extending from 1987 through 1992, which resulted in farmers attempting to make up deficits by groundwater pumping.

Many cities within the valley, including Bakersfield, rely primarily on ground water for urban use. San Joaquin Valley cities occasionally obtain supplemental water supplies from local surface water and some imported water.

The CVP and the State Water Project (SWP) were developed specifically to supplement groundwater resources in the San Joaquin Valley with surface water. Prior to development of the CVP and SWP, overdraft conditions resulting in land subsidence occurred from extensive groundwater development and the reliance on groundwater during drought years. Subsidence can potentially compact the sediments and lower infiltration capabilities of a groundwater aquifer causing surface elevations to drop and, therefore, has an undesired impact on conjunctive use programs in the region (DWR 1994).

In some areas of the San Joaquin Valley regional groundwater levels declined by more than 300 feet during the 1940's and 1950's. The development of surface water supplies in the 1950's and 1960's reduced reliance on groundwater and helped control the rapidly declining groundwater levels. The decline in groundwater levels resulted in an approximate 5,200 square mile area, primarily in the Tulare Basin, having at least one foot of land subsidence over a 50-year period (1920-1970). During the early 1980's there was a trend toward groundwater basin recovery, but this recovery was short lived due to the recurrence of drought conditions. A reduction in surface water supplies in the late 1980's and early 1990's resulted in water users relying on groundwater supplies to meet their demand, which perpetuated groundwater overdraft and land subsidence.

The southern two-thirds of the Central Valley regional aquifer system covers an area from Fresno County to Kern County (DWR 1995b). Between 1970 and 1993, the total mean annual groundwater extraction within this area was 4.6 million af. An annual total average of 0.44 million af (9.5 percent) was used to meet urban needs and 4.2 million af (90.5 percent) was used for agriculture (Table 9). The total mean annual overdraft during this period was nearly 0.8 million af.

Table 9 Summary data for groundwater basins within the southern two-thirds of the Central Valley regional aquifer.

Surface Area (acres)	Storage Capacity (af)	Annual Extraction (af)	Urban Use (af)	Agricultural Use (af)	Average Annual Overdraft (af)
3,904,800	25,370,000	4,620,000	439,000	4,181,000	797,000

Source: DWR 1995b.

Average annual water supplies supported by about 650,000 af of overdraft are generally adequate to meet average net water demands within the southern two-thirds of the Central Valley (DWR

1994). During a drought, supplies from combined sources are insufficient to meet present demands, resulting in shortages of about 512,000 af (DWR 1994). Without additional water management programs, drought year annual shortages are expected to be about 1,097,000 af by 2020 (DWR 1994).

The shortages require both short-term drought management plans and other long-term programs depending on the overall level of water service reliability deemed necessary by local agencies to sustain the economic health of the region (DWR 1994).

Tulare County's General Plans

The County of Tulare's General Plan 2025, which was most recently updated in 2006, has established a goal of minimizing the possibility for loss of life, injury, or damage to property as a result of flood hazards. (County of Tulare 2007)

3.1.2 Environmental Consequences

No Action Alternative

Under the No Action Alternative, Reclamation does not approve the Contract and License to allow flood control operations and introductions into the FKC. Pumping facilities would not operate under the No Action Alternative. Additional Non-Project Water from the Kings, Kaweah and Tule rivers could flow into the Tulare Lake Basin, jeopardizing human safety and property. Water quality within the Reclamation conveyance facilities would be unaffected because Non-Project Water would not be pumped into the FKC. Holders of water rights would either accept released floodwater that they have a right to or refuse to pump such floodwater. Water quality in the Kings, Kaweah and Tule rivers downstream of the FKC could contain additional suspended sediment if the Non-Project Water that could have been pumped increases soil erosion within or along these drainages.

The No Action Alternative could expose people and structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee. Additional Non-Project Water from the Kings, Kaweah and Tule rivers could flow into the Tulare Lake Basin. The No Action Alternative conflicts with the County of Tulare General Plan 2025 flood protection goal (County of Tulare 2007).

The generation of electrical power on the Kings, Kaweah and Tule rivers is unrelated to pumping of Non-Project Water into the FKC. The District facilities are downstream of hydroelectric facilities on these rivers. The generation of electrical power would continue as in the past.

Reclamation is required by Executive Order (EO) 11988 to provide leadership and take action to reduce the risk of flood loss and to minimize the impact of floods on human safety, health and welfare. During its review and consideration of the Proposed Action, Reclamation must evaluate

the potential impacts in flood plains. The No Action Alternative does not provide for risk reductions and is inconsistent with EO 11988.

Proposed Action

Surface Water Past introductions and conveyances of Non-Project Water have occurred infrequently during large flood events in the Kings, Kaweah and Tule Rivers. Introductions of Non-Project Water would be infrequent, intermittent, unreliable and small relative to existing river flows, water needs and operations.

The level of flood protection is contingent upon the amount of Non-Project Water and available capacity in the FKC. The Proposed Action is consistent with the County of Tulare's General Plan 2025 flood protection goal (County of Tulare 2007). The Proposed Action would reduce the exposure of people, land and improvements to risk of damage as a result of flooding or levee failure.

License terms and conditions explicitly address the pumping station operations and require compliance with water, ground and air pollution laws of Reclamation, and state and local authorities. In addition, the Contract includes terms and conditions that explicitly address the aspects of Non-Project Water introductions, capacity and coordination among various agencies including compliance with water, ground and air pollution laws of local, state and federal agencies. Failure to comply would result in the termination of the Contract and License. Requirements to comply with these laws and regulations provide additional safeguards to the water resources in the action area.

The Proposed Action would not substantially alter existing drainage patterns or the beneficial aspects periodic flood flows have on channel morphology. Variations in annual flows important to aquatic and riparian habitats have continued since the original contracts in 1978. The Proposed Action would not interfere with existing deliveries of water for environmental purposes in the Tulare Lakebed. The District would continue to coordinate and provide water to wetland areas in the vicinity of the Tulare Lakebed as in the past, including providing water to restored wetlands.

The introduction of this Non-Project Water into the FKC would not alter water rights held by the United States to pump water from the San Joaquin River.

Friant Division and Cross Valley contractors would have occasional access to additional water supplies to put to beneficial use. Since this water would be available during wetter periods the water will most likely be used for recharge. This recharge would begin to ameliorate the continuing overdraft in the San Joaquin Valley and provide some additional conjunctive use water supply benefits.

Wetlands The proposed project does not interfere with existing deliveries of water for environmental purposes in the Tulare Lakebed. The District would continue to coordinate and provide water to wetland areas in the vicinity of the Tulare Lakebed, as in the past, including providing water to restored wetlands.

The long-term Warren Act contract providing additional flood relief to lands within the District will not impede or reduce that availability of floodwater to WRP properties. The District is committed to providing floodwater to these WRP properties as it is a far less expensive place to dispose of Non-Project Water than to pump, wheel and dispose of Non-Project Water via the FKC (D Moss 2007 pers. comm.).

Water Quality The Reclamation License issued to the District specifies that the District shall comply with all applicable water pollution laws and regulations of the United States, the State of California and local authorities (Appendix D). The Contract (Appendix B) obligates the District to comply with Reclamation's water quality monitoring requirements and standards. If the water quality in the canal is negatively affected by the pump-ins sufficiently to cause hard to the CVP or Friant Division contractors, the Contract will be terminated. This minimizes in-canal water quality impacts.

The Proposed Action will not impact water quality in the rivers. Water quality is not affected by diversion of a portion of the river's flow. The discharge of the Contract flood flows into the Kern River will not affect water quality in that river either. The oversight by the Rivermaster and the typically small quantity (proportionally) of water discharged will minimize impacts to the Kern River.

Additionally the District, the FWA, Friant M&I water users and Reclamation would all conduct water quality analyses to determine pump in impacts. A Reclamation approved laboratory would routinely test water samples to ensure compliance with applicable water quality control standards. The District would be required to collect a sample to be tested for the constituents of concern for drinking water (Title 22) to determine the flood flow water quality. The FWA field staff will be testing the FKC water upstream and downstream of each river to measure the change in turbidity caused by the pump-ins and to observe how well it is diluted. Reclamation staff would collect samples of the FKC every 3 months that are tested for the Title 22 constituents. The municipal and industrial contractors along the canal would also routinely test the raw water before treatment. If Reclamation determines that the quality of the Non-Project Water will substantially degrade the quality of CVP water, the District shall arrange for the immediate termination of the introduction of Non-Project Water from specific sources into the FKC.

Non-Project Water proposed for introduction into the FKC must comply with all applicable water pollution laws and regulations of Reclamation, and state and local authorities. Should silt accumulate in the FKC or channels as a result of the diversion activities, District would remove the silt accumulation as directed by Reclamation and the FWA, or reimburse Reclamation and the FWA for costs associated with its removal. The District also would be required to take steps to screen debris from the Non-Project Water prior to pumping.

Due to the established monitoring and reporting requirements included as part of the Proposed Action, the diversion of Non-Project Water from the Kings, Kaweah and Tule rivers would have no adverse effect on water quality within these drainages. Water quality within the rivers downstream of the pumping plants is unlikely to change, but if introductions decreased flows and soil erosion, a minor improvement in downstream water quality may result.

Groundwater The amount of pumped flood flows is dependent upon rain events, snowmelt and available capacity in the FKC. Groundwater recharge facilities in locations with desirable conditions and facilities could receive floodwater and alleviate some of the groundwater overdraft conditions. Quite often at the same time as the pump-ins are occurring, the Kern River is also in flood conditions which fills the available spreading and recharge facilities in the Kern Fan area.

Discharges into the Kern River at the terminus of the FKC are coordinated with the City of Bakersfield. This Non-Project Water would provide a slight and short-term benefit by recharging the groundwater as it flows down the Kern River.

Coordination of discharges into the Kern River would occur with the City of Bakersfield to ensure this water can be accommodated. The Proposed Action is consistent with EO 11988. Depending on what quantity of water could be diverted and recharged by the Friant Division or Cross Valley contractors, there would be a small recovery of the groundwater overdraft during the intermittent events which would support conjunctive use for the districts that have the facilities to make use of the supplies.

Overall, the Proposed Action would improve flood management, groundwater supplies and would not impact CVP operations, facilities, water right holder's surface water supplies, water quality, or wetlands.

Kern River Only Alternative

Impacts of this alternative are similar to those of the Proposed Action with the exception that no additional water would be supplied to the Friant Division or Cross Valley contractors. These contractors would lose the opportunity to put this potential additional supply to beneficial use. As diverted flood flows would normally be above and beyond the agricultural water demand in

the year of the diversion, the supplies would typically be recharged for conjunctive use and provide a water supply in low water supply years.

Cumulative Effects

The conveyance of this Non-Project Water is contingent upon hydrological conditions and capacity in the FKC and acceptable conditions in the Kern River. Discharges to the Kern River could result in limited groundwater recharge on a local and short-term basis. This water could be extracted during dry seasons to meet current demands. The conjunctive use of surface and groundwater supplies to meet existing demands within fluctuating hydrological conditions has occurred historically. The Proposed Action, when added to other related actions, does not result in long-term cumulative effects to water supplies.

The Proposed Action would provide flood protection for the Tulare Lake Basin in addition to that provided by the enlargement of Terminus Dam. As discussed in the Affected Environment Section, Terminus Dam was enlarged to reduce Tulare Lake Basin flooding and this project in coordination with the Dam raising will have a somewhat greater flood protection result than either project alone. Depending on the hydrology this coordinated effect will have a greater or lesser flood protection result. At times of peak flood flows, the cumulative flood protection is still a small percentage of the stream flows however during small flood events, the coordinated projects would result in no flooding. The enlargement of Terminus Dam and Proposed Action do not contribute to increases in water supplies, changes in land use or increases in the need for floodplain insurance.

The Proposed Action would offset the water lost by the Friant Division due to river restoration intermittently and only for those that have the facilities and capacity to make use of the opportunity.

The Proposed Action would not result in a cumulative increase in the use of electrical power. This water would be pumped after it has been released from dams and power producing facilities.

3.2 Land Use

3.2.1 Affected Environment

Delta Lands Reclamation District NO. 770

The 13,400 acre District is located in the heart of the Tulare Basin in the southern San Joaquin Valley (Figure 1). Agriculture dominates the land use in the lowland areas of the basin. Fresno, Kings, Tulare and Kern counties, which form part of the basin, represent four of the top ten farm counties in California and some of the leading agricultural counties in the nation. Urban centers, including Fresno, Visalia, Tulare, Hanford and Bakersfield, and numerous smaller communities support this important agricultural industry.

Land Use Conversion

The vast majority of the private land within the Tulare Lake Basin is used for irrigated agriculture. Three million acres of irrigated agriculture occur between the southern limit of the San Joaquin River watershed and the crest of the Tehachapi Mountains, versus 176,300 acres of urban areas (DWR 1998). Between 1996 and 1998, the counties of Fresno, Kern, Tulare and Kings were in the top seven urbanizing counties within California and the top eight with the most irrigated farmland converted to urban land during the same period (CDC 2000). The predicted outcome from the recent trends in land conversion in relation to water availability and use within the Tulare Lake Basin is an increase in M&I net water use of 112 percent by 2020 due to population increases throughout the region.

Land conversion continues within the Tulare Basin, but the majority of this conversion is now from irrigated farmland to other uses, primarily urban (CDC 2000). The California Department of Conservation's (CDC) Farmland Mapping and Monitoring Program supplies land use conversion information for decision makers to use in their planning for the present and future use of California's agricultural land (CDC 2000). The CDC's 2000 report on land conversion clearly indicates that the net effect of land conversion within the Tulare Basin between 1996 and 1998 was a loss in irrigated land (Table 10). The net losses of irrigated farmland in Fresno, Kern, Kings and Tulare counties between 1996 and 1998 ranged from 4,532 acres in Tulare County to 7,410 acres in Fresno County (Table 10) (CDC 2000).

Table 10 Summary of changes in reported land use from 1996 to 1998 in counties comprising the Tulare Basin.

	Shifts to Irrigated Farmland	Shifts to Urban & Built-Up from:	Irrigated Farmland Downgrades		
	Grazing, Local, Other land & Urban to Prime, Statewide & Unique	Prime, Statewide & Unique	Prime, Statewide & Unique to Other Land	Prime, Statewide & Unique to Local & Grazing	County
Fresno	+6,262	-3,557	-5,794	-4,321	-7,410
Kern(1)	+8,391	-1,579	-9,910	-4,008	-7,106
Kings	+8,409	-1,969	-3,897	-7,584	-5,041
Tulare(1)	+8,369	-2,060	-7,402	-3,439	-4,532

(1) Includes important and interim farmland areas as defined in California Department of Conservation 2000.
Source: California Department of Conservation 2000.

Definitions:

Prime Farmland: The best combination of physical and chemical features able to sustain long-term production of agricultural crops. The land must have been used for the production of irrigated crops at some time during the two update cycles prior to the mapping date.

Farmland of Statewide Importance: Similar to Prime Farmland but with minor shortcomings (*i.e.* greater slopes or lower moisture storage ability). The land must have been used for the production of irrigated crops at some time during the two update cycles prior to the mapping date.

Unique Farmland: Land of lesser quality soils used for the production of the state's leading agricultural crops. Usually irrigated, but may include non-irrigated orchards or vineyards. The land must have been cropped at some time during the two update cycles prior to the mapping date.

Farmland of Local Importance: Land of importance to the local agricultural economy, determined by each county's board of supervisors.

Grazing Land: Land, at least 40 acres in size, on which the existing vegetation is suited to the grazing of livestock, defined cooperatively by the California Cattlemen's Association, the University of California Cooperative Extension Service and others interested in grazing activities.

Urban and Built-Up Land: Land occupied by structures with a building density of at least 1 unit per 0.5 acre, or approximately 6 structures per 10-acre parcel.

Water: Water area with an extent of at least 40 acres.

Other Land: Land which does not meet the criteria of any other category.

Between 1996 and 1998, the counties of Fresno, Kern, Tulare and Kings were in the top seven urbanizing counties within California and the top eight with the most irrigated farmland converted to urban land during the same period (CDC 2000). Crop acreages have generally declined in the region over the last decade, due to limited availability of surface water and economic pressures (DWR 1994). Very little new agricultural land will be brought into production in the future (DWR 1994). Most good irrigable land with access to dependable imported or local surface water has been developed.

Non-agricultural and non-urban lands were converted to agricultural land between 1996 and 1998 (CDC 2000). New irrigated agriculture in the southern portion of Kings County converted 5,760 acres of grazing land, and 5,093 acres of non-agricultural and non-urban land were converted to irrigated land in Kern County (CDC 2000).

The predicted outcome from the recent trends in land conversion in relation to water availability and use within the Tulare Basin is an increase in M&I net water use due to large population increases throughout the region (DWR 1994). Agricultural water use may actually decline by seven percent as irrigation efficiencies continue and agricultural land is converted to urban use (DWR 1994). Converting agricultural land to urban use increases water use slightly and often requires higher water quality, and more dependable supplies of water (DWR 1994). Converting agricultural land to urban use also tends to diminish natural recharge and deep percolation of agricultural applied water to the groundwater basins because of the nonporous nature of concrete and asphalt used in the urban areas (DWR 1994).

Friant and Cross Valley Contractors

Arvin-Edison Water Storage District AEWSD was formed in 1942 and its original size was 129,988 acres. Currently, AEWSD comprises 132,000 acres, of which, 109,230 acres are irrigated. Urbanization has changed approximately 2,500 acres of agricultural lands to M&I. The main crops in AEWSD are grapes, potatoes, oranges and cotton.

Chowchilla Water District CWD encompasses 123.95 square miles of land primarily to the west of California State Highway 99 and straddling California State Highway 152. There are 65,000 irrigated acres in the district, all of which is irrigated with CVP water. The district grows six primary crops and receives an average of 125,000 af of CVP water per year. As of 1999, there were 13,200 acres of alfalfa, 14,600 acres of almonds, 7,600 acres of cotton, 9,000 acres of corn, 8,100 acres of grapes and 5,000 acres of sorghum grown in the district.

City of Lindsay Lindsay is located on the east side of the San Joaquin Valley in Tulare County near the base of the Sierra foothills and has falling grade from east to west. Lindsay is traversed by State Highway 65 running north and south along the west side of the City. Lindsay

is located approximately 12 miles east of Tulare and State Highway 99, approximately 11 miles north of Porterville and 15 miles southeast of Visalia. Lindsay is an agricultural service center. The agricultural industry is built around citrus (oranges), and 12 orange packing houses, providing the major component of the economic base.

City of Orange Cove The City of Orange Cove's use of its CVP water service contract is for M&I purposes.

County of Fresno The County of Fresno's current use of its water supply is for M&I purposes.

County of Madera Hidden Lake Estates is located on the north side of Millerton Lake off of Hidden Lake Boulevard, a spur of Madera County Road 210. Hidden Lake Estates is approximately 153 acres and is served through pipes. The district is entirely municipal and is not fully built out.

Delano-Earlimart Irrigation District The district is comprised of 56,474 acres, of which 46,581 are irrigated. The main crops in DEID are grapes, almonds, deciduous and subtropical orchards.

Exeter Irrigation District EID is comprised of approximately 15,184 acres and 12,700 are irrigated. The City of Exeter is located within EID. However, EID serves only agricultural water. The main crops grown in EID are citrus, grapes, plums and olives.

Fresno County Waterworks #18 FCWW#18 has a CVP water service contract supply of 150 ac-ft which is delivered for M&I purposes.

Fresno Irrigation District FID, which now comprises some 245,000 acres, lies entirely within Fresno County and includes the rapidly growing Fresno-Clovis metropolitan area. Total irrigated area exceeds 150,000 acres, although this number has been decreasing in recent years as a result of urban expansion. The main crops in FID are grapes, citrus, and cotton.

Garfield Water District The district is 1,750 acres in size; of which 1,300 acres are irrigated. The predominant crops in GWD are grapes, almonds, citrus, olives and stone fruits.

Gravelly Ford Water District The district is approximately 13 square miles in size. There are 7,603 irrigated acres in the district. Vines cover just over 4,000 acres of land in the district and are the primary crop. Almonds, cotton and alfalfa are also grown in the district, covering roughly 1,100 acres, 1,400 acres and 500 acres respectively.

Hill's Valley Irrigation District HVID is approximately 20 miles east of Fresno and 5 miles north of Orange Cove. HVID was formed in 1948 and is currently 4,223 acres, of which 3,067 are irrigated. The main crops in HVID are citrus and grapes.

International Water District IWD's water is delivered for agricultural purposes to permanent crops, mainly citrus.

Ivanhoe Irrigation District IID includes 11,202 acres, of which 10,648 are irrigated. The main crops in IID are grapes, citrus, deciduous fruits, and olives.

Kern-Tulare Water Districts KTWD is located on the eastern side of the San Joaquin Valley in Kern and Tulare counties, approximately 8 miles east of Delano and 27 miles north of Bakersfield, California. The District is approximately 4 miles in width generally located west of State Highway 65, and extends approximately 14 miles from Sherwood Avenue to Avenue 48. Land use within Kern-Tulare Water District is 97 percent permanent crops (primarily citrus, subtropical orchards, grapes and nuts). KTWD formerly served approximately 14,000 acres of irrigated agriculture. The former RGWD serves approximately 5,638 acres of irrigated agriculture. The district now consists of a total of 19,638 acres.

Lindmore Irrigation District LID is located in Tulare County at the base of the Sierra foothills. The District's northern boundary extends approximately 2 miles from Lindsay and extends approximately 1 ½ miles south of Strathmore. LID is approximately 9 miles long and 10 miles wide and comprises 27,255 acres, of which 25,700 are irrigated. The main crops grown in LID are oranges, olives, cotton, and alfalfa.

Lindsay-Strathmore Irrigation District The district is located in Tulare County on the east side of the San Joaquin Valley. The district comprises 15,700 acres, of which approximately 12,700 acres are irrigated to permanent crops. The main crops in LSID are oranges and olives.

Lower Tule River Irrigation District LTRID is located in Tulare County on the east side of the San Joaquin Valley. State Highway 99 bisects the District in a north-south direction, and the Tule River flows westerly through the entire length of the District. The FKC is located five miles to the east of the District's northeast boundary and adjoins the southeast portion of the District between Avenues 136 and 128. The towns of Woodville, Popular and Tipton lie within the District's boundaries but are not serviced by LTRID. The main crops in LTRID are alfalfa, grain/hay and cotton.

Madera Irrigation District MID consists of 13,646 acres. A portion of the city of Madera lies within the boundaries of MID. MID does not provide surface water supplies to the city of Madera. The main crops in MID are grapes, almonds, cotton, cereals, and grasses.

Orange Cove Irrigation District The district is about 30 miles southeast of Fresno and 20 miles north of Visalia. The District is 14 miles long and 3 miles wide and has 28,000 acres, of which approximately 26,788 are irrigated. The main crops in OCID are citrus, grapes, deciduous and subtropical orchards, olives, and nuts.

Pixley Irrigation District PID is currently approximately 69,550 acres in size with 48,302 acres being irrigated. The district is an agricultural district and does not provide any water for M&I use although their contract is an Agricultural and M&I contract. The major crops are alfalfa, silage and grapes.

Porterville Irrigation District PoID is comprised of 17,400 acres, of which 13,061 are irrigated. The main crops in PoID are walnuts, cotton, grapes, alfalfa, plums corn and wheat.

Saucelito Irrigation District SID was formed in 1941 and is located in Tulare County, approximately ten miles southwest of Porterville, two miles south of Poplar, eight miles east of Tipton and five miles west of Terra Bella. The main crops in SID are milo, wheat, cotton, grapes and almonds.

Shafter-Wasco Irrigation District Currently, the District is comprised of 38,766 acres, of which 32,000 are irrigated. Included within the District's boundaries are the cities of Shafter and Wasco covering approximately 2,400 acres. The main crops in SWID are almonds, cotton, alfalfa, nursery stock, grains, grapes, blackeye beans and carrots. SWID has a history of transferring small amounts of water to neighboring districts.

Southern San Joaquin Municipal Utility The towns of Delano and McFarland are within the District's boundaries but are not serviced by SSJMUD. Currently, SSJMUD is comprised of approximately 61,000 acres, of which 47,000 are irrigated. The main crops in SSJMUD are alfalfa, citrus, grapes, cotton, nuts and barley.

Stone Corral Irrigation District SCID is located in Tulare County, approximately 30 miles southeast of Fresno and 10 miles north-northeast of Visalia. The district's longest portion, north to south, is 3 ¼ miles and its greatest width, east to west, is 3 miles. SCID is comprised of 6,488 acres, of which 5,470 acres are irrigated. The main crops are citrus, cotton, deciduous and subtropical fruit trees.

Tea Pot Dome Water District TPWD is comprised of 3,282 acres, and all are irrigated. TPDWD relies mostly on their CVP contract water supplies.
The main crops are citrus and olives.

Terra Bella Irrigation District TBID is comprised of 13,962 acres, of which, 11,165 are irrigated. The town of Terra Bella is located within the District's boundaries with an estimated population of 3,870. TBID provides CVP and groundwater CVP for domestic purposes and to the town of Terra Bella. The district provides agricultural water, in addition to, M&I water for domestic use. The main crops are nuts, deciduous fruit orchards, and citrus.

City of Fresno The City of Fresno is an M&I only contractor who utilizes their 60,000 af water service contract supply to recharge the groundwater in and around the city allowing them to withdraw groundwater on demand to serve municipal needs.

Tri-Valley Water District TVWD has approximately 2,727 acres of irrigated agriculture.

Tulare Irrigation District TID was formed in 1889 and is located in western Tulare County on the eastside of the San Joaquin Valley. TID currently is comprised of 70,000 acres, of which, approximately 62,000 are irrigated. The city of Tulare lies on the eastern portion of the District at the intersection of the Southern Pacific and Santa Fe Railroads and on U.S. Highway 99. TID provides only agricultural water supplies and does not service the city of Tulare. The main crops in TID are alfalfa, field corn, wheat and cotton.

3.2.2 Environmental Consequences

No Action Alternative

Farmland will continue to be converted to urban land throughout the Tulare Lake Basin in response to the increasing human population. Flooding in the Tulare Lake Basin under the No Action Alternative would not facilitate urbanization and may act as a deterrent to development in the Tulare Lake Basin in the environs of Tulare Lake. Farmland may be temporarily taken out of production if subjected to flooding.

Proposed Action

The Proposed Action would not conflict with existing zoning for agricultural use or promote the conversion of farmland to non-agricultural use. Conveyance of the Non-Project Water would be infrequent, intermittent, unpredictable and small, relative to existing water needs and operations. Prevention of inundation of farmlands would not change rates of land conversion but would allow existing farmland to remain productive in years when flooding would have impacted productivity.

The Proposed Action involves water that is infrequent and unpredictable. Conveyance of this Non-Project Water is contingent upon available capacity in the FKC and conditions in the Kern River. The Proposed Action would not lead to any long-term land use decisions. The Proposed Action would maintain existing land uses and would not contribute to impacts to land uses or planning.

Kern River Only Alternative

Impacts of this alternative are similar to those of the Proposed Action. No land use changes would occur as a result of this alternative due to lack of reliability of the water supply.

Cumulative Effects

The No Action Alternative could result in adverse cumulative effects to agricultural operations within the Tulare Lake Basin, the intensity of which would depend on the frequency and magnitude of future flood events. If Non-Project Water introductions were not authorized, the Tulare Lake Basin could experience additional flooding during winter and spring months. Agricultural lands could be temporarily taken out of production and services supporting agricultural operations could be adversely affected. The economics of farming land subject to occasional inundation may drive farmers to accelerate taking agricultural lands out of production.

Reclamation's action is the conveyance of the water to the terminus of the FKC where it would flow into the Kern River. Subsequent actions are beyond Reclamation's authority and approvals. Due to the amount of precipitation during flood years, floodwater would not likely be pumped to maintain or grow crops in the same year. It is possible for this water to be groundwater banked and extracted later during dry seasons. The use of this stored floodwater in dry seasons would be used to maintain and grow crops on existing agricultural lands. No native or previously untilled lands would be put into production. Therefore, there would be no long-term cumulative effects as a result of the Proposed Action.

3.3 Air Quality

3.3.1 Affected Environment

The District lies within the San Joaquin Valley Air Basin (SJVAB), the second largest air basin in California. Air basins share a common "air shed," the boundaries of which are defined by surrounding topography. Although mixing between adjacent air basins inevitably occurs, air quality conditions are relatively uniform within a given air basin. The San Joaquin Valley experiences episodes of poor atmospheric mixing caused by inversion layers formed when temperature increases with elevation above ground, or when a mass of warm, dry air settles over a mass of cooler air near the ground.

The pollutants of greatest concern in the San Joaquin Valley are carbon monoxide (CO), ozone (O3) and inhalable particulate matter (PM10). The San Joaquin Valley region is currently considered a non-attainment area with respect to these pollutants. Ozone is formed by a photochemical reaction in the atmosphere, rather than being emitted directly into the air, and is the most relevant pollutant for the proposed project because the majority of the O3 produced in

the San Joaquin Valley originates from gasoline and diesel engines. The pumps used to pump water in the FKC are powered by both electricity and diesel engines.

Ozone is a regional pollutant because photochemical reactions require time to occur, and high O3 levels often develop downwind of emission sources. Ozone precursors react in the atmosphere in the presence of sunlight to form O3. Ozone pollution is primarily a problem in summer because photochemical reaction rates depend on the intensity of ultraviolet light and air temperatures above 59° F. Higher air temperatures and increased ultraviolet light intensity increase the rate of ozone production.

The SJVAB has been identified as both a receptor and source of transported O3 (San Joaquin Valley Unified Air Pollution Control District [SJVUAPCD] 2002). Other regions contributing to O3 in the San Joaquin Valley include the San Francisco and Broader Sacramento Air Basins. Ozone accumulates in the San Joaquin Valley due to the climatic conditions and bowl-shaped topography.

3.3.2 Environmental Consequences

No Action Alternative

Pumping facilities would not operate and air quality would not be affected.

Proposed Action

The License issued by Reclamation stipulates that the District shall comply with all applicable air pollution laws and regulations of the United States, the State of California and local authorities. Electric and diesel-powered pumps would be used to pump water from the Kings, Kaweah and Tule Rivers. All of the District's diversion pumps have never been used simultaneously, their use is infrequent and use occurs during weather conditions unfavorable for ozone production.

The 18 diesel-powered pumps that the District might operate represent less than one percent of the 4,500 irrigation pumps used in the San Joaquin Valley (Maxwell 2003). The portable diesel pumps are registered at the local and/or state level, have emission standards established within the registration requirement and the emissions are accounted for in the current emission inventory. The federal Title V Program does not apply to these pumps because the diesel engines are classified as non-road portable and would only operate for up to four to five months during years when Non-Project Water is pumped.

Friant Division and Cross Valley contractor turnouts are gravity and would not result in additional pumping.

Kern River Only Alternative

Impacts of this alternative are similar to those of the Proposed Action.

Cumulative Effects

No construction would be required by the action, nor would the number of pump stations or engines increase. The existing portable diesel pumps are already accounted for in the current emission inventory. Therefore, Proposed Action would not cumulatively affect air quality.

3.4 Noise

3.4.1 Affected Environment

The Non-Project Water diversion points are in rural areas with low levels of noise. Noise receptors are relatively far away from the pumps which are the noise generation source.

3.4.2 Environmental Consequences

No Action Alternative

District pumping facilities would not operate under the No Action Alternative, and therefore there would be no impact on the level of noise.

Proposed Action

The diesel and electric powered pumps used to pump Non-Project Water into the FKC would generate infrequent, periodic noise. The District is required by Reclamation's License to comply with the Fresno and Tulare County Noise Ordinance regulations. Additionally, the District would comply with all federal and state noise standards and ordinances. The District has, and will continue to work with the few residents near the pumping plants, to reduce the noise levels when the pumps are in operation. The District has implemented noise reduction strategies based on the recommendations of a noise consultant and contacts persons residing near the pumping facilities prior to pumping, to address issues. Based on historic frequency, such Non-Project Water introductions will occur, on average, every three to four years. During diversion periods, the pumps operate up to four to five months during the late winter, spring and early summer. Persons would not be exposed to excessive noise levels or excessive ground borne vibration and/or ground borne noise levels. The Proposed Action would not expose people residing or working at the pump station to excessive noise levels.

The District will provide Reclamation and the FWA with the project specific data as required to determine compliance with the criteria contained within the applicable Fresno and Tulare County Noise Ordinance regulations. The License also requires the District to respond to any complaints from adjoining landowners regarding noise and take appropriate actions or cease pumping operations .

Kern River Only Alternative

Impacts of this alternative are similar to those of the Proposed Action.

Cumulative Effects

The Proposed Action would be compliant with Fresno and Tulare County ordinances, regulated, intermittent and short-term and would not contribute to long-term or cumulative impacts from noise.

3.5 Biological Resources

3.5.1 Affected Environment

This section analyzes the potential impacts to listed (under the federal Endangered Species Act) and non-listed species and habitats with the potential to occur in the study area. The study area is located in the San Joaquin Valley and includes those portions of Fresno, Kings, Tulare, and Kern counties. The study area is limited to the downstream drainages of the three potentially pumped rivers (Kings, Kaweah and Tule) and the area surrounding the FKC. Areas upstream from the pumping plants were excluded from consideration because flows in the upper reaches are not affected by pumping. The Kern River is not considered part of the study area as Reclamation has no action related to the Non-Project Water once it enters the Kern River system upon the approval of the Kern River watermaster.

The following list (See Table 11) was obtained on February 6, 2009, by accessing the U.S. Fish and Wildlife Database: http://www.fws.gov/pacific/sacramento/es/spp_lists/auto_list.cfm. The list is for the following USGS 7½ minute quadrangles (quads): Piedra, Wahtoke, Sanger, Reedley, Selma, Burris Park, Laton, Riverdale, Lemoore, Burrel, Vanguard, Stratford, Stratford SE, Woodlake, Ivanhoe, Exeter, Visalia, Monson, Traver, Porterville, Woodville, Cairns Corner, Tulare, Tipton, Taylor Weir, Corcoran and El Rico Ranch (Table 11) (USFWS 2007).

Table 11 Federal-status wildlife and plant species with the potential to occur in the vicinity of the Kings, Kaweah/St. Johns and Tule River pumping facilities, and along those drainages downstream from the Friant-Kern Canal.

Common Name and Scientific Nomenclature	Listed Status	CNDDB Occurrences Within Quadrangles Covering:	
		Pumping Facility(s)	Drainage(s)
WILDLIFE			
Invertebrates			
Vernal pool fairy shrimp *Branchinecta lynchi*	FT & CH	Kings, Kaweah, Tule	Kings, Kaweah, Tule
Vernal pool tadpole shrimp *Lepidurus packardi*	FE & CH		Kings
Conservancy fairy shrimp *Branchinecta conservatioi*	FE		
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	FT	Kaweah	Kings, Kaweah

Fish			
Delta smelt *Hypomesus transpacificus*	FT		
Amphibians and Reptiles			
California tiger salamander (*Ambystoma californiense*)	FT & CH	Kings, Kaweah	Kings, Kaweah
Blunt-nosed leopard lizard *Gambelia sila*	FE		Tule
California red-legged frog *Rana aurora draytonii*	FT		
Giant garter snake *Thamnophis gigas*	FT		Kings
Mountain yellow-legged frog *Rana muscosa*	FCS		
Birds			
California Condor *Gymnogyps californianus*	FE		
Mammals			
Fresno kangaroo rat *Dipodomys nitratoides exilis*	FE		Kings
Giant kangaroo rat *Dipodomys ingens*	FE		
Tipton kangaroo rat *Dipodomys nitratoides nitratoides*	FE	Tule	Kings, Tule
San Joaquin kit fox *Vulpes macrotis mutica*	FE	Kaweah, Tule	Kings, Kaweah, Tule
PLANTS			
San Joaquin adobe sunburst *Pseudobahia peirsonii*	FT	Kings, Kaweah, Tule	Kings, Kaweah, Tule
Keck's checkerbloom *Sidalcea keckii*	FE & CH		
San Joaquin Valley orcutt grass *Orcuttia inaequalis*	FT & CH		
Hoover's spurge *Chamaesyce hooveri*	FT & CH		Kaweah
Springville clarkia *Clarkia inaequalis*	FT		
FE = Federally Endangered FT = Federally Threatened		CH=Critical Habitat FCS= Federal Candidate Species	

Although not on the FWS's species list, the following species were listed on the CNDDB as being observed in the area (Table 12):

Table 12 Species Occurrences Identified in the CNDDB not on the FWS Species List

Common Name and Scientific Nomenclature	Listed Status	CNDDB Occurrences Within Quadrangles Covering:	
		Pumping Facility(s)	Drainage(s)
PLANTS			
Greene's orcutt grass *Tuctoria greenei*	FE	Kaweah	Kings, Kaweah

California jewelflower *Caulanthus californicus*	FE	Tule	Tule
WILDLIFE			
Western Snowy Plover *Charadrius alexandrinus nivosus*	FT		Kings

Adjacent quadrangles were included in the query when the pumping facility was near the border of a quadrangle. The query results were based on the following quadrangles:

- Kings River Pumping Station
    - Piedra, Wahtoke
- Kaweah/St. Johns Pumping Station
    - Woodlake, Ivanhoe, Exeter
- Tule River Pumping Station
    - Porterville, Woodville, Cairns Corner

Designated or proposed Critical habitat for the Fresno kangaroo rat (*Dipodomys nitratoides exilis*), California Condor (*Gymnogyps californianus*), vernal pool fairy shrimp (*Branchinecta lynchi*), vernal pool tadpole shrimp (*Lepidurus packardi*), Hoover's spurge (*Chamaesyce hooveri*), San Joaquin Orcutt grass (*Orcuttia inaequalis*), and California tiger salamander (*Ambystoma californiense*) occurs within the action area, but the pumping facilities on the Kings, Kaweah/St. Johns and Tule rivers are outside of the critical habitat for these species.

Habitat loss and degradation affecting animals and plants occurs within the action area and is projected to continue to affect special-status species in the southern San Joaquin Valley. However, actions taken by Reclamation, in concert with protections afforded by regional conservation plans such as the Metropolitan Bakersfield Habitat Conservation Plan and the Kern Water Bank Habitat Conservation Plan/Natural Community Conservation Plan, ameliorate such adverse effects and play a key role in achieving the goal of maintaining and preserving special-status species and their native habitats.

Designated or proposed critical habitats for the California Condor, Fresno kangaroo rat, vernal pool fairy shrimp, vernal pool tadpole shrimp, Hoover’s spurge, San Joaquin Valley orcutt grass, and California tiger salamander occur within the action area. The California Condor, though extremely rare throughout its range, may occasionally forage over the action area. The Fresno kangaroo rat has not been recorded in Fresno County since 1992 and may be extirpated from critical habitat within the action area. Vernal pool fairy shrimp critical habitat within the action area is restricted to a few locations in Kings and Tulare counties. Critical habitat for vernal pool tadpole shrimp, Hoover’s spurge and San Joaquin Valley orcutt grass within the action area is confined to a small number of areas in Tulare County. Six units of the proposed critical habitat for the California tiger salamander are located within or near the action area.

EO 11990-Protection of Wetlands was issued on May 24, 1977 in furtherance of the NEPA (42 U.S.C. 4321 et seq.) in order to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative. EO 11990 does not apply to the issuance by federal agencies of permits, licenses, or allocations to private parties for activities involving wetlands on non-federal property.

The Tulare Lake Basin has been recognized historically as one of the primary components of the Central Valley's once vast wetland/upland ecosystem complex and continues to support remnant and restored wetlands. Restored wetlands within the basin, including those in the federal WRP, provide highly productive wildlife habitats for water birds as well as other groups of avian and mammalian species.

3.5.2 Environmental Consequences

No Action Alternative

Upland and terrestrial riparian habitats for special-status species occur in isolated patches along the Kings, Kaweah and Tule river basins and could be adversely impacted by inundation caused by flooding. The flow regimes within the affected drainages would be tempered by the action alternative, but still remain at flood levels. Historically, diversions from the affected drainages have been infrequent and proportionately small for those made from the Kings River. Diversions from the Kaweah and Tule Rivers have averaged about 20% of flows, but they too have been infrequent.

Proposed Action

In light of the uncertainty associated with flood events, the nature of past floods was used for the purpose of this analysis to predict and assess the potential effects.

Pump-in Operations The infrastructure required for the District to pump Non-Project Water from the Kings, Kaweah and Tule River systems is complete and operational, requiring no further construction that might affect biological resources. No ground disturbing activities would be associated with the operation and maintenance of the three pumping facilities. The License precludes the use of pesticides on the FKC right-of-way without prior written permission of Reclamation. Additionally, the license agreement includes requirements to place the portable pumps prior to the active period for valley elderberry longhorn beetle at sites where pumps are within the protective zone around host plants.

Pumps would be installed at the Tule River and at the St. John's River Pump Station #1, where elderberry plants are either not present, or are no closer than 130 feet distant, respectively. Consequently, disturbance would be avoided at these two stations. A third set of pumps would

be installed at the Kings River Station. This pump station is 60 feet from one elderberry bush, but any disturbance would be insignificant because of access via existing roadway. The St. John's River Pump Station #2 is near three clumps of elderberries, one of which contained a plant with two possible VELB exit holes (Live Oak Associates 2008). However, no pumps will be installed at this site in order to avoid possible disturbance. Additionally, at the three sites where pumps would be installed, all possible effort will be made to install pumps prior to March, or as early thereafter as possible, to minimize activity when VELB could be active. Finally, removal of pumps would occur after June, after the period of beetle activity Through the use of these measures, effects to VELB are considered insignificant and not likely to adversely affect this species.

The CNDDB query revealed records for California tiger salamander in the vicinity of the Kings and Kaweah/St. Johns River pumping facilities, for the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) and Greene's orcutt grass (*Tuctoria greenei)* in the vicinity of the Kaweah/St. Johns River pumping facilities; records for the San Joaquin kit fox (*Vulpes macrotis mutica*) in the vicinity of the Kaweah/St. Johns and Tule River pumping facilities, records for the vernal pool fairy shrimp and the San Joaquin adobe sunburst *(Pseudobahia peirsonii)* in the vicinity of the Kings, Kaweah, and Tule River pumping facilities; records for the Tipton kangaroo rat *(Dipodomys nitratoides nitratoides)* in the vicinity of the Kaweah/St. Johns and Tule River pumping facilities and records for the California jewelflower *(Caulanthus californicus)* in the vicinity of the Tule River pumping facilities (Table 12). The operation and maintenance of the three pumping facilities would not involve ground disturbance or disturbance to vegetation, including the host plant of valley elderberry longhorn beetle, and therefore, no direct adverse effects to special-status species are expected from pump-in activities. Activities for operation and maintenance would require use of existing roadways only. These roadways are commonly traveld by Friant Water Authority vehicles and the additional vehicle traffic would be minimal.

Critical Habitat The critical habitat for the California Condor is outside the region directly affected by floodwater in the Tulare Lake Basin. Thus, pumping water from the rivers would have no adverse effect on critical habitat for the California Condor.

Diversions from the Kings River are an exceedingly small fraction of the flows (historically 0.58% or less) and these would either minimally decrease flood volumes or would not affect flows in Fresno Slough. The Proposed Action would, therefore, have no adverse effect on the critical habitat for the Fresno kangaroo rat or would have a minor positive effect through added flood protection.

Critical habitat for the vernal pool fairy shrimp and the vernal pool tadpole shrimp within the Cross Creek Unit are connected to flows in the St. Johns River; however, the majority of the

critical habitat is upstream of the confluence of Cottonwood Creek and the St. Johns River. Critical habitat upstream of this confluence will not be directly affected by changes in flood flows within the St. Johns River. Critical habitat for Hoover's spurge and San Joaquin Orcutt grass occurs upstream of the confluence of Cottonwood Creek and the St. Johns River, and will not be directly impacted by Non-Project Water introduced into the FKC. Any backwater flooding would be minimal and not be expected to meaningfully affect the extent or duration of inundation.

Critical habitat for vernal pool fairy shrimp within the Pixley Unit occurs in two subunits: one southeast of Corcoran within the floodplain of the Tule River and another subunit that includes portions of the Pixley National Wildlife Refuge. The northern subunit could experience a minor level of flood protection.

Portions of the critical habitat for the California tiger salamander within the final Cross Creek Unit are connected to flows in the St. Johns River. Critical habitat in the basin upstream of the confluence with the St. Johns River will not be directly affected by changes in flood flows within the St. Johns River. Some upland habitat within a portion of Cross Creek Unit 5A may receive reduced flood flows, although Cross Creek typically carries high flows before pumping occurs and continues to transport high flows when the pumps are operating. California tiger salamanders breeding within vernal pools within the floodplain might benefit from a reduction in the volume of floodwater flowing across the floodplain of Cross Creek.

Changes to Flows Introductions from the Kings, Kaweah and Tule rivers under previous contracts were intermittent and infrequent. Diversions from the Kings River always were small while those from the Kaweah and Tule Rivers ranged to around 30% of flows. Future introductions to the FKC under the Proposed Action are expected to be similar or even smaller for all watersheds but the Tule River. For the Tule River, with the seismic concerns related drawdown there is less storage so the flood events would be expected to be greater than when the reservoir was operating with its design capacity. These introductions would not result in reduced river flows that contain less oxygen, higher temperatures or other changes that could detrimentally impact fish or other aquatic life. The average flow downstream of the pump stations on the Kings, Kaweah and Tule rivers have always remained well above the average flow in years when pumping occurred (Table 3). Under past actions on the Kings River, for instance, the maximum percent of flow diverted was 0.58 percent when the flow was 148 percent of average. The maximum percent of flow diverted over an annual basis was higher in the Kaweah and Tule Rivers, 30 and 34%, respectively. The effects of diversions on a monthly basis when all years are included show that 20% of flows may be reduced, but if data are considered only in years when diversions are made, the proportion of monthly flow reductions would be greater.

The Corps manages water releases from the dams to maintain flows within the channel, thereby protecting adjacent uplands, if possible. Breached levees, rather than high flow volumes, are likely to be the cause of flooding in uplands along these rivers.

The proposed project does not interfere with existing deliveries of water for environmental purposes in the Tulare Lakebed. The Proposed Action would only pump water from the Kings River when 3,200 cfs of water is being pumped south to Tulare Lakebed and flood flows north to the San Joaquin River have been maximized. No direct connections occur between existing wetlands and the Kaweah and Tule rivers downstream from the FKC.

Non-Project Water would be discharged into the Kern River at the terminus of the FKC. The reach of the Kern River between the FKC and the California Aqueduct-Kern River Intertie differs from the Kings, Kaweah and Tule rivers in that the Kern River may be the recipient, rather than the donor, of pumped Non-Project Water. The Kern River, for short periods of time on an infrequent and intermittent basis, may experience increased flows as a result of the Proposed Action.

The disposition of Non-Project Water that would be discharged at the terminus of the FKC into the Kern River would be coordinated with the City of Bakersfield. The volume of introduced Non-Project Water would be small in relation to the large recharge capacity in the region, and the deliveries represent a minor component of the operations. Discharges into the Kern River have averaged 14 percent of the Kern River flows at the time (Table 5). Ensuring that the Kern River can adequately accommodate discharges from the FKC is in the best interest of the City of Bakersfield and others residing near the Kern River. The Proposed Action would not cause or attenuate flooding along the Kern River. Therefore, no adverse effects are anticipated.

The *Delta Lands Reclamation District No. 770 Warren Act Contract Biological Evaluation* dated April 17, 2006 and the analysis of direct, indirect and induced and interrelated effects indicate that the intensity of the effects from the Proposed Action would be low. While the Proposed Action may affect threatened and endangered species it is not likely to adversely affect listed species or designated critical habitat.

Invasive Species Control Reclamation recognizes the importance of limiting the spread of nuisance or invasive plant and animal species and shares the responsibility for controlling invasive species (EO 13112) that infest water systems, including reservoirs, rivers, distribution canals, etc. Reclamation's understanding is that hydrilla (*Hydrilla verticillata*) and Dodder (*Cuscuta spp.*) are of greatest concern along the FKC (Steve Lewis personal communication) because of hydrilla's potential to block canals, drains, and water control structures and Dodder's potential to infest many crops, ornamentals, native plants, and weeds.

Hydrilla and Dodder entering the FKC would have to originate upstream of the canal in the watersheds of the rivers to be diverted for the Proposed Action to potentially contribute to the spread of these species. Reclamation's review indicates that hydrilla has not been a concern upstream of the FKC on the Kaweah (Larry Dotson, personal communication) and Kings (Steve Haugen, personal communication) river systems. The California Department of Food and Agriculture's Hydrilla Eradication Program treated the Costa Ponds near Springville in 2001, but hydrilla has not been reported as a problem in the Tule River.

Dodder is widespread in the San Joaquin Valley and a range of methods (seeds dispersed by people through the movement of soil, equipment, or in mud attached to shoes and tires) can spread seeds. Infestations contributing seed sources along the Kings, Kaweah or Tule River systems have not been documented.

Reclamation requires that the submerged intakes of the District's pumps be screened, limiting debris and other objects from being drawn into the pumps. Should Non-Project Water pumped under the proposed Contract be identified as a significant source of invasive species in the future, Reclamation has the authority to terminate or limit the introduction of such Non-Project Water into the FKC. In compliance with Executive Order 13112 on Invasive Species, Reclamation will continue to implement feasible and prudent measures to minimize risk of harm from the spread of invasive species.

Delivery to Friant and Cross Valley Contractors Friant and Cross Valley contractors are required to comply with the BOs issued during the long-term contract renewal process which require water delivered into their districts to be used in ways that do not harm endangered or threatened species. Adherence to these BOs will ensure that the delivery of these flood waters do not adversely impact species.

Kern River Only Alternative

Impacts of this alternative are similar to those of the Proposed Action.with the exception that no additional water would be supplied to the Friant Division or Cross Valley contractors.

Cumulative Effects

The Corps has enlarged Terminus Dam located on the Kaweah River to provide increased flood protection to the City of Visalia and downstream agricultural lands, and increased water supply storage for irrigation. The Terminus Dam project will reduce periodic flood flows from reaching the Tulare Lakebed (Corps 1996). The Corps determined that small flood events (less than 3.2-year events) would no longer flood the lakebed and larger events would be decreased in magnitude. The effects of these reductions were quantified by the Corps and Service, and it was determined that the primary project impacts resulted from reductions in the frequency, acreage and duration of the relatively frequent, smaller events occurring in the lakebed. Impacts

stemming from enlarging Terminus Dam have been fully mitigated. In years when damaging flows threaten the Tulare Lakebed, more than a thousand acres of flooded mitigation habitat will be provided for water birds.

Non-Project Water introductions by the District would not contribute substantial cumulative impacts to water birds within the Tulare Lakebed. Introductions by the District have occurred since 1978 and represent the existing conditions within the Tulare Lakebed during infrequent major flood events. Flood flows into the Tulare Lakebed will still occur from the Tule and Kings rivers with an anticipated magnitude similar to past events when floodwater was pumped. The proposed project does not interfere with existing deliveries of water for environmental purposes in the Tulare Lakebed, including wetlands. Impacts from raising Terminus Dam have been fully mitigated and future Non-Project Water introductions from the Kaweah River by the District would continue to be conducted in coordination with the Corps, the FWA, and the local water users represented by the Kings River Water Association, the Kaweah and St. Johns Rivers Association, and the Tule River Association.

As previously stated, Reclamation and the Service have jointly developed an ESA compliance strategy intended to minimize further losses within the CVP service areas and to offset impacts from ongoing CVP operations. Reclamation and the Service continue to implement the commitments and conservation measures in the biological opinions issued for CVP operations and contract renewals.

The January 19, 2001 BO on the continued operation of the CVP addressed CVP operational threats to special-status species. The Service stated in that BO that Reclamation's ESA compliance strategy is intended to minimize further losses within the CVP service areas and to offset effects from ongoing CVP operations. The contribution of the Proposed Action to these operations is anticipated to be negligible or non-existent, and future conditions for listed or proposed species would not be expected to differ significantly, with or without the Proposed Action.

The Non-Project Water introduced under the Proposed Action would remain intermittent, unpredictable and small in comparison to the operation of the FKC. In accordance with the License, the Non-Project Water impounded, stored or carried would not be used otherwise than as prescribed by law. The Report would be used to track this water and to minimize the possibility of contributing to potential cumulative habitat modifications due to agricultural production and urban expansion.

Numerous activities continue to eliminate habitat for listed and proposed threatened and endangered species in the southern San Joaquin Valley. Habitat loss and degradation affecting both animals and plants continues as a result of urbanization, oil and gas development, road and

utility right-of-way management, flood control projects, grazing by livestock and agricultural practices. Listed and proposed animal species are also affected by poisoning, shooting, increased predation associated with human development and reduction of food sources. All of these non-federal activities are expected to continue to adversely affect listed and proposed species in the southern San Joaquin Valley.

Actions taken by Reclamation, however, in concert with protections afforded by regional conservation plans such as the Metropolitan Bakersfield Habitat Conservation Plan and the Kern Water Bank Habitat Conservation Plan/Natural Community Conservation Plan, help to ameliorate such adverse effects and play a key role in achieving the goal of maintaining special-status species and their native habitats.

3.6 Cultural Resources

3.6.1 Affected Environment

Cultural resources is a term used to describe both 'archaeological sites' depicting evidence of past human use of the landscape and the 'built environment' which is represented in structures such as dams, roadways, and buildings. The National Historic Preservation Act (NHPA) of 1966 is the primary Federal legislation which outlines the Federal Government's responsibility to cultural resources. Other applicable cultural resources laws and regulations that could apply include, but are not limited to, the Native American Graves Protection and Repatriation Act (NAGPA), and the Archaeological Resources Protection Act (ARPA). Section 106 of the NHPA requires the Federal Government to take into consideration the effects of an undertaking on cultural resources on or eligible for inclusion in the National Register of Historic Places (National Register). Those resources that are on or eligible for inclusion in the National Register are referred to as historic properties.

The Section 106 process is outlined in the Federal regulations at 36 CFR Part 800. These regulations describe the process that the Federal agency (Reclamation) takes to identify cultural resources and the level of effect that the proposed undertaking will have on historic properties. In summary, Reclamation must first determine if the action is the type of action that has the potential to affect historic properties. If the action is the type of action to affect historic properties, Reclamation must identify the area of potential effects (APE), determine if historic properties are present within that APE, determine the effect that the undertaking will have on historic properties, and consult with the State Historic Preservation Office (SHPO), to seek concurrence on Reclamation's findings. In addition, Reclamation is required through the Section 106 process to consult with Indian Tribes concerning the identification of sites of religious or cultural significance, and consult with individuals or groups who are entitled to be consulting parties or have requested to be consulting parties.

The CVP is being evaluated for the National Register of Historic Places (NRHP). Facilities related to this study area include the Delta Mendota Canal, Friant Dam and the Friant Kern Canal. Friant Dam is located on the San Joaquin River, 25 miles northeast of Fresno, California. Completed in 1942, the dam is a concrete gravity structure, 319 feet high, with a crest length of 3,488 feet. The FKC carries water over 151.8 miles in a southerly direction from Millerton Lake to the Kern River, four miles west of Bakersfield. The water is used for supplemental and new irrigation supplies in Fresno, Tulare, and Kern Counties. Construction of the canal began in 1945 and was completed in 1951.

3.6.2 Environmental Consequences

No Action Alternative

The No Action alternative will result in no potential to affect historic properties pursuant to the regulations at 36 CFR Part 800.3(a)(1). Increased flooding within the Tulare Lake Basin under the No Action Alternative is unlikely to affect cultural or archaeological resources as flooding has happened in the past prior to execution of contracts to pump flood flows.

Proposed Action

The infrastructure required for the District to pump Non-Project Water from the Kings, Kaweah and Tule River systems is complete and operational, requiring no further construction that might affect archaeological or historical resources. The introduction of Non-Project Water does not require new conveyance facilities, and flows within the facilities would not exceed capacity; therefore, archaeological and historic resources bordering these facilities would be unaffected. Non-Project Water would be conveyed and disposed of within existing facilities and not materially impair archaeological or historical resources through demolition, destruction, relocation or alteration of these resources or their immediate surroundings. Reclamation is determining the impacts to cultural resources. The EA will not be finalized until a determination is made. Due to the fact that there is no ground disturbance or impact to CVP facilities it is likely that the proposed action has no potential to affect historic properties pursuant to 36 CFR Part 800.3(a)(1).

Kern River Only Alternative

Impacts of this alternative are similar to those of the Proposed Action with the exception that no additional water would be supplied to the Friant Division or Cross Valley contractors.

Cumulative Effects

The Proposed Action does not require new facilities or infrastructure, and would not contribute to cumulative impacts to archaeological or historical resources.

3.7 Indian Trust Assets

3.7.1 Affected Environment

Indian Trust Assets (ITAs) are legal interests in property held in trust by the U.S. for federally-recognized Indian tribes or individual Indians. An Indian trust has three components: (1) the trustee, (2) the beneficiary, and (3) the trust asset. ITAs can include land, minerals, federally-reserved hunting and fishing rights, federally-reserved water rights, and in-stream flows associated with trust land. Beneficiaries of the Indian trust relationship are federally-recognized Indian tribes with trust land; the U.S. is the trustee. By definition, ITAs cannot be sold, leased, or otherwise encumbered without approval of the U.S. The characterization and application of the U.S. trust relationship have been defined by case law that interprets Congressional acts, executive orders, and historic treaty provisions.

Consistent with President William J. Clinton's 1994 memorandum, "Government-to-Government Relations with Native American Tribal Governments," Reclamation assesses the effect of its programs on tribal trust resources and federally-recognized tribal governments. Reclamation is tasked to actively engage federally-recognized tribal governments and consult with such tribes on government-to-government level (59 Federal Register 1994) when its actions affect ITAs. The Department of the Interior Departmental Manual Part 512.2 ascribes the responsibility for ensuring protection of ITAs to the heads of bureaus and offices (DOI 1995). Part 512, Chapter 2 of the Departmental Manual states that it is the policy of the Department of the Interior to recognize and fulfill its legal obligations to identify, protect, and conserve the trust resources of federally recognized Indian tribes and tribal members. All bureaus are responsible for, among other things, identifying any impact of their plans, projects, programs or activities on Indian trust assets; ensuring that potential impacts are explicitly addressed in planning, decision, and operational documents; and consulting with recognized tribes who may be affected by proposed activities. Consistent with this, Reclamation's Indian trust policy states that Reclamation will carry out its activities in a manner which protects Indian trust assets and avoids adverse impacts when possible, or provides appropriate mitigation or compensation when it is not. To carry out this policy, Reclamation incorporated procedures into its NEPA compliance procedures to require evaluation of the potential effects of its proposed actions on trust assets.

3.7.2 Environmental Consequences

No Action Alternative

Additional floodwater from the Kings, Kaweah and Tule rivers might flow into the Tulare Lake Basin. ITAs would be unaffected by flooding in the Tulare Lake Basin.

Proposed Action

Since the Proposed Action would not cause any land disturbing activities or change historical water use patterns, the Proposed Action would not interfere with Indian water rights and would not affect ITAs.

Kern River Only Alternative

Impacts of this alternative are similar to those of the Proposed Action with the exception that no additional water would be supplied to the Friant Division or Cross Valley contractors.

Cumulative Effects

The Proposed Action would not affect ITAs and, therefore, would not contribute to long-term or cumulative effects on ITAs.

3.8 Socioeconomic Resources

3.8.1 Affected Environment

The human population in the southern San Joaquin Valley increased substantially in the 1980's, led by 50 to 60 percent growth in the Fresno, Bakersfield and Visalia-Tulare urban areas (DWR 1998). This trend is expected to continue and the region's population is projected to more than double over the next 30 years. Fresno's population, which had one of the highest growth rates among large metropolitan areas in the United States during the 1980's, grew by more than 60 percent from 217,000 in 1980 to 354,000 in 1990. This growth was attributed to a high birth rate and relatively low-cost housing that encouraged immigration from out-of-state as well as from the San Francisco Bay and Los Angeles areas (DWR 1998a). This trend is expected to continue and the region's population is projected to more than double in the next 30 years. Continued future growth is expected in Fresno, the Visalia-Tulare area and Bakersfield (DWR 1998). Between 1996 and 1998, the counties of Fresno, Kern, Tulare and Kings were in the top seven urbanizing counties within California and the top eight with the most irrigated farmland converted to urban land during the same period (CDC 2000).

A statewide water shortage of between 1.1 and 2.4 million af is predicted by the year 2020 to meet the demands of the growing human population. The predicted outcome from the recent trends in land conversion, in relation to water availability and use within the Tulare Lake Basin, is an increase in M&I net water use due to population increases throughout the region. These population and land conversion trends are expected to continue.

Agriculture is the leading industry within the Tulare Lake Basin, as reflected by the majority of the private land being used for irrigated agriculture. Three million acres of irrigated agriculture occurs between the southern limit of the San Joaquin River watershed and the crest of the Tehachapi Mountains, versus 176,300 acres of urban areas (DWR 1998).

For the Tulare Lake Region, the unemployment rate is higher than in urban areas (Table 13), attributed to a large seasonal labor market and limited availability of employment in other industries. Unemployment for Fresno, Kern, and Tulare counties ranged from 12.1 to 15.6 percent in 1997 but decreased to 4.5 to 8.5 percent in 2006. Statewide unemployment was 6.3 percent in 1997 but dropped to 4.9 percent in 2006 (see Table 13). As the farming economy declines, the employment opportunities also decline.

Table 13 County-Level Socioeconomic Data

County	2006 Population (estimate)	2006 Civilian Labor Force	2006 Employment	1999 Per Capita Income (most recent available)	2006 Unemployment Rate (%)
Fresno	**891,756**	**414,800**	**381,400**	**$15,495**	**8.0%**
Kern	**780,117**	**338,400**	**312,800**	**$15,760**	**7.6%**
Tulare	**419,909**	**189,400**	**173,300**	**$14,006**	**8.5%**
Kings	**146,153**	**55,600**	**50,900**	**$15,848**	**8.5%**
Totals	**2,237,935**	**998,200**	**918,400**		**8.0%**
California	**36,457,549**	**17,901,900**	**17,029,300**	**$22,711**	**4.9%**

Sources: Census Bureau 2006, EDD 2006

3.8.2 Environmental Consequences

No Action Alternative

All required pumping and conveyance facilities have been constructed and would not be modified under either the No Action or Proposed Action alternatives. Floodwater from the Kings, Kaweah and Tule rivers could flow into the Tulare Lake Basin. Floodwater could cause temporary crop damage, affect agricultural operations, including the planting of crops, affect the seasonal demand for farm laborers and affect enterprises supporting agricultural production.

Proposed Action

All required pumping and conveyance facilities have been constructed and would not be modified under either the No Action or Proposed Action alternatives. All introduced Non-Project Water would be disposed of within existing facilities and require no new construction.

The population and land conversion trends previously described are expected to continue with or without implementing the Proposed Action. The Non-Project Water introduced under the Proposed Action would be intermittent, unpredictable and small in comparison to demand.

Pumped Non-Project Water would be discharged into the Kern River. This water could recharge the groundwater locally and be extracted during dry periods to meet a small fraction of future demands. Uses of this Non-Project Water could include irrigation, groundwater banking, wetland enhancement and restoration, or municipal and industrial uses. However, Reclamation does not have approval authority for subsequent diversions or uses of this Non-Project Water.

Pumping the flood flows would provide an economic benefit to landowners in the Tulare Lake Basin. Reductions in costs for repairing public facilities, public services and emergency resources would also occur on a small local scale.

The Contract issued by Reclamation would require that the District comply with EO 11246 of September 24, 1965, and the rules, regulations and relevant orders of the Secretary of Labor pertaining to equal employment opportunity. In the event of noncompliance with the nondiscrimination clauses of the Contract or with any of such rules, regulations or orders, the Contract may be canceled, terminated or suspended in whole, or in part, and the District may be declared ineligible for further government contracts.

Kern River Only Alternative

Impacts of this alternative are similar to those of the Proposed Action with the exception that no additional water would be supplied to the Friant Division or Cross Valley contractors.

Cumulative Effects

The availability of this Non-Project Water is infrequent, unreliable and small compared to the existing water demand. The Proposed Action would not provide long-term or reliable water supplies that would support growth nor contribute to cumulative impacts on population or housing.

The Proposed Action does not set a precedent for flood control operations and introductions into the FKC. The Proposed Action has no negative effect on socio-economic resources and has a small positive effect. The Proposed Action, when added to other local, state and federal actions would not result in significant impacts to socio-economic resources. The introductions of flood

flows are short-term and intermittent actions. This Non-Project Water would provide local recharge to the groundwater providing a slight benefit to groundwater users. The cost of pumping of groundwater is high if adequate surface water supplies are available. In dry years when surface water is scarce, more groundwater is pumped to maintain existing conditions and agricultural crops. The Proposed Action would not encourage long-term land use changes or planning that would change economical conditions.

The cost for emergency services might be reduced. However, this benefit would be on a small scale and is contingent upon available capacity in the FKC and the ability to dispose of Non-Project Water. Therefore, the Proposed Action would not contribute to major cumulative effects to socio-economical conditions or resources.

3.9 Environmental Justice

3.9.1 Affected Environment

EO 12898, dated February 11, 1994, requires Federal agencies to ensure that their actions do not disproportionately impact minority and disadvantaged populations. Many agricultural jobs require unskilled labor and the pay tends to be low. For instance, agricultural jobs accounted for 20.5 percent of all employment in Kings County in 2001 (Umbach 2002). Average per capita income in 1999 for Kings County was the lowest in the state at $15,732, compared to a $29,856 state average (Umbach 2002). According to 2000 Census data, 44 percent of the population in Kings County is Hispanic/Latino, compared to a statewide figure of 32 percent for that statistic (Umbach 2002).

3.9.2 Environmental Consequences

No Action Alternative

Additional floodwater from the Kings, Kaweah and Tule rivers could flow into the Tulare Lake Basin causing damage to crops and reducing job opportunities for minority and low-income farm laborers.

Proposed Action

The Proposed Action would provide an option for some amount of flood protection within the Tulare Lakebed and reduce adverse impacts to minority or low-income farm laborers.

Kern River Only Alternative

Impacts of this alternative are similar to those of the Proposed Action with the exception that no additional water would be supplied to the Friant Division or Cross Valley contractors.

Cumulative Effects

The Proposed Action is an intermittent action and would not contribute to long-term or cumulative effects on agricultural lands or employment opportunities for low-income or disadvantaged populations.

Section 4 Consultation and Coordination

4.1 Fish and Wildlife Coordination Act (16 USC § 651 et seq.)

The Fish and Wildlife Coordination Act requires that Reclamation consult with fish and wildlife agencies (federal and state) on all water development projects that could affect biological resources. The implementation of the CVPIA, of which this action is a part, has been jointly analyzed by Reclamation and the FWS and is being jointly implemented. The Proposed Action does not involve construction projects. Therefore the FWCA does not apply.

4.2 Endangered Species Act (16 USC § 1521 et seq.)

Section 7 of the ESA requires federal agencies, in consultation with the Secretaries of Commerce and the Interior, to ensure that their actions do not jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of these species.

The Proposed Action would support existing uses and conditions. No native lands would be converted or cultivated with CVP water. The water would not be used for land conversion. The proposed project does not interfere with existing deliveries of water for environmental purposes in the Tulare Lakebed. Effects to listed species and critical habitat are not expected, or would be insignificant, or possibly slightly beneficial, and therefore, the Proposed Action may affect but is not likely to adversely affect federally listed threatened or endangered species or their designated habitats. Reclamation will consult with the FWS and no action will be taken or finalization of this environmental analysis will be done until consultation is complete.

4.3 National Historic Preservation Act (15 USC § 470 et seq.)

The National Historic Preservation Act (NHPA) of 1966, as amended (16 USC 470 *et seq*.), requires that federal agencies consider the effects of an undertaking on cultural resources listed on or eligible for inclusion in the National Register of Historic Places. The regulations at 36 CFR Part 800 implement Section 106 of the NHPA.

Compliance with Section 106 follows a series of steps that are designed to identify interested parties, determine the area of potential effects (APE), conduct cultural resource inventories, determine if historic properties are present within the APE, and assess affects on any identified historic properties. No construction, new land use, or new ground disturbing activities would occur as a result of the Proposed Action. Therefore, the proposed action has no potential to affect historic properties (36 CFR 800.3(a)(1).

4.4 Migratory Bird Treaty Act (16 USC § 703 et seq.)

The Migratory Bird Treaty Act implements various treaties and conventions between the U.S. and Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. Unless permitted by regulations, the Act provides that it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not. Subject to limitations in the Act, the Secretary of the Interior (Secretary) may adopt regulations determining the extent to which, if at all, hunting, taking, capturing, killing, possessing, selling, purchasing, shipping, transporting or exporting of any migratory bird, part, nest or egg will be allowed, having regard for temperature zones, distribution, abundance, economic value, breeding habits and migratory flight patterns.

The Proposed Action would have no effect on birds protected by the Migratory Bird Treaty Act.

4.5 Executive Order 11988 – Floodplain Management and Executive Order 11990 - Protection of Wetlands

EO 11988 (See Appendix E) requires Federal agencies to provide leadership and take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, and health and welfare among other activities. To accomplish these goals agencies are instructed to prepare floodplain assessments for actions located within or affecting flood plains, and similarly, EO 11990 places similar requirements for actions in wetlands. Although the project does reduce potential flood flows which meets the goals of the EO, the project does not affect the flood plain itself and therefore the project does not require Reclamation to take the actions required in EO 11988. The project does not affect wetlands and therefore the project would not affect either EO.

Section 5 List of Preparers and Reviewers

Judi Tapia, Supervising Natural Resource Specialist, SCCAO
Ned Gruenhagen, PhD. Wildlife Biologist, SCCAO
Barbara Hidleburg, Contract Repayment Specialist, SCCAO
Jonathan Connolly, Archeologist, MP Region
Patti Clinton, Natural Resource Specialist, SCCAO, reviewer

Section 6 References

California Department of Conservation. 2000. California Farmland Conversion Report 1996-1998. Division of Land Resource Protection, Farmland Mapping and Monitoring Program.

County of Tulare 2007 County of Tulare General Plan 2025 http://generalplan.co.tulare.ca.us/ accessed 1-18-08

Department of Water Resources (DWR). March 1994. Bulletin 155 General Comparison of Water Districts, Kern Water Agency page 185 Located at web page address: http://elib.cs.berkeley.edu/kopec/b155/html/home.html

Department of Water Resources (DWR). 1998. California Water Plan Update Bulletin 160-98, Executive Summary. California Department of Water Resources, Statewide Planning Branch. 850pp.

Maxwell, L. A. 2003. 10 Florez bills target pollution. Fresno Bee. February 23, 2003.

Murray, Burns and Kienlen Consulting Civil Engineers. 1971. Flood Control Master Plan for the County of Tulare, California. June 1971. Sacramento, CA.

San Joaquin Valley Unified Air Pollution Control District [SJVUAPCD]. 2002. Air pollution in the San Joaquin Valley. Web page http://www.valleyair.org/newsed/apvalley.htm.

Tulare County Resource Conservation District. 1994. Long Range Plan. Resource Conservation District Watershed Information Sharing Project. Visalia, CA.

Umbach, K. W. 2002. San Joaquin Valley: Selected Statistics on Population, Economy, and Environment. California Research Bureau, CRB 02-010. Sacramento, CA. 75 pp.

U.S. Army Corps of Engineers [Corps]. 1996. Final Environmental Impact Statement/Environmental Impact Report, Kaweah River Basin Investigation Feasibility Study, California. Sacramento District.

U.S. Bureau of Reclamation [Reclamation]. 2000. National Environmental Policy Act Handbook: Public review draft. U.S. Department of Interior, Washington D.C. 602pp.

U.S. Department of Interior (USDI). 1980. Departmental manual. Part 516, Environmental Quality and National Environmental Policy Act of 1969. Revised March 18, 1980. Number 2244.

U.S. Fish and Wildlife Service [Service]. 2002. Informal section 7 Endangered Species Act Consultation on Delta Lands Reclamation, District 770, Warren Act Contracts Occurring

Under the Authority of the United States Bureau of Reclamation, South – Central California Area Office. Letter dated August 21, 2002 (1-1-02-I-2813). U.S. Fish and Wildlife Memorandum. Sacramento Fish and Wildlife Office, Sacramento, California.

Wikipedia 2007 http://en.wikipedia.org/wiki/Tulare_Lake accessed 12/27/07